

Crustacea Decapoda : Deep-sea Palaemonoid shrimps from New Caledonian waters

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ABSTRACT

A small collection of 31 specimens of deep-sea palaemonoid shrimps has been examined and found to contain eight undescribed species : five species of the genus *Periclimenes*, *P. parvispinatus*, *P. fujinoi*, *P. uniunguiculatus*, *P. vaubani*, *P. richeri* ; one species of *Pontonia*, *P. monnioti* ; a second species of the genus *Mesopontonia*, *M. gracilicarpus* and one species of a new genus, *Altopontonia*, *A. disparostris*. One specimen of *P. vaubani* was collected from 650 m, representing

the greatest depth from which material was obtained. Most of the species collected are probably associates of other marine invertebrates, but only one association was established with certainty, that of *P. monnioti* with an ascidian host. Only three of the species collected have been previously described, and two, *Urocaridella gracilis* and *Anchistioidea willeyi*, are now recorded for the first time from over 100 m.

RÉSUMÉ

Crustacea Decapoda : Crevettes Palaemonides des eaux profondes de la Nouvelle-Calédonie.

Trente et une crevettes appartenant au sous-ordre des Palaemonoidea ont été récoltées dans les eaux profondes de la Nouvelle-Calédonie. Elles appartiennent à douze espèces dont trois seulement étaient connues. Parmi les neuf autres, l'une, *Periclimenes* sp., était trop abîmée pour être identifiée au-delà du genre ; les huit restantes, nouvelles, comprennent cinq *Periclimenes*, *P. parvispinatus*, *P. fujinoi*, *P. uniunguiculatus*, *P. vaubani* et *P. richeri*, une *Pontonia*, *P. monnioti*, une *Mesopontonia*, *M. gracilicarpus*, qui est la deuxième espèce connue du genre, et une espèce d'un nouveau genre *Altopon-*

tonia, *A. disparostris*. Le spécimen capturé à la plus grande profondeur est un *P. vaubani* trouvé à 650 m.

Cette étude porte de 21 à 33 le nombre des Palaemonoidea indo-ouest-pacifiques trouvées à plus de 100 m de profondeur.

Les espèces étudiées ici, de même que les espèces d'eau peu profonde qui leur sont voisines, sont très vraisemblablement commensales d'autres invertébrés marins, mais ceci n'a pu être établi avec certitude que pour une seule espèce, *Pontonia monnioti*, qui vit par couple dans une ascidie. *Mesopontonia gracilicarpus* doit être associée à une gorgone et les divers *Periclimenes* probablement à des coelentères ou des échinodermes.

INTRODUCTION

Shrimps of the suborder Palaemonoidea are at their greatest diversity in shallow tropical waters, with relatively few recorded from deeper water. The indo-west pacific deep-sea pontoniine fauna, reviewed by BRUCE (1981, 1985) reported only 21 species. With the addition of palaemonoid species described in the present report, the number is now increased to 33, with the following genera represented: *Periclimenes* (19 spp.), *Periclimenaeus* (3 spp.), *Mesopontonia* (2 spp.) and *Urocaridella*, *Palaemonella*, *Dasycaris*, *Plesiopontonia*, *Altopontonia*, *Thaumastocaris* and *Anchistioides* (1 sp. each), all known from over 100 m depths.

The material here studied is derived from a series of campaigns all made in the deeper waters off New Caledonia, in 1985, 1986 and 1987, with the exceptions of those designated under the name of MUSORSTOM 5, which took place in the Chesterfield Islands (see RICHER DE FORGES, this volume p. 00).

Most of the species so far recorded are probably, like so many of their shallow water relatives, associated with marine invertebrate hosts but the collecting methods generally employed, trawls or dredges, obscure any superficial associations that may be represented. Shrimps living on the outer surfaces of coelenterate or echinoid hosts are likely to have these relationships obscured, whereas those living inside sponges or ascidians seem more likely to have them preserved. It seems that further information, possibly to be provided through the increased use of submersibles, will be necessary before the relative importance of commensalism in deeper water can be properly assessed.

In the following account, carapace length refers to the postorbital carapace length. The specimens are deposited principally in the collections of the Muséum national d'Histoire naturelle, Paris.

SPECIES LIST

1. *Urocaridella gracilis* Borradaile, 1915
2. *Periclimenes hertwigi* Balss, 1913
3. *Periclimenes parvispinatus* sp. nov.
4. *Periclimenes fujinoi* sp. nov.
5. *Periclimenes uniunguiculatus* sp. nov.
6. *Periclimenes vaubani* sp. nov.
7. *Periclimenes richeri* sp. nov.
8. *Periclimenes* sp.
9. *Pontonia monnioti* sp. nov.
10. *Altopontonia disparostris* gen. nov., sp. nov.
11. *Mesopontonia gracilicarpus* sp. nov.
12. *Anchistioides willeyi* Borradaile, 1899

SYSTEMATIC ACCOUNT

PALAEMONINAE

UROCARIDELLA Borradaile, 1915*Urocaridella gracilis* Borradaile, 1915

RESTRICTED SYNONYMY

Urocaridella gracilis Borradaile, 1915 : 210; 1917 : 352, pl. 53, fig. 2. — KEMP 1922 : 122.

Leander urocaridella Holthuis, 1950 : 28. — JOHNSON, 1960 : 55; 1976 : 29.

MATERIAL EXAMINED. — New Caledonia. Lagoon survey : stn 397, 22°39.5' S, 167°10.6' E, 125 m, 23 January 1985 : 1 ♀ (MNHN-NA 11245).

REMARKS. — The single example was collected from the Grand Récif Sud and has a carapace

length of 3.7 mm, with a rostral dentition of 7/10, with three postrostral teeth situated on the carapace, three of the distodorsal teeth being small and preterminal. The mandibular palps were readily visible.

This species has not been previously recorded from depths of over 100 m. The Siboga Expedition specimens (HOLTHUIS, 1950) were collected in depths of not more than 55 m. Not previously recorded from New Caledonia.

DISTRIBUTION. — Type locality : Maldiv Islands. Also known from Chilka Lake, India, Andaman Islands, Mergui Islands, Singapore, and Indonesia.

PONTONIINAE

PERICLIMENES Costa, 1844

Periclimenes hertwigi Balss, 1913

Figs 1-2, 39c

RESTRICTED SYNONYMY

Periclimenes hertwigi Balss, 1913 : 235; 1914 : 49, figs 28-30.

Periclimenes (Ancylocaris) gracilipes Kubo, 1940, 41, figs 8-10.

Periclimenes (Periclimenes) hertwigi - HOLTHUIS, 1952 : 43, figs 11-12.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn CP 45, 22°47' S, 167°15' E, 430-405 m, 30 August 1985 : 1 ♂, 1 ovig. ♀ (MNHN-NA 12570). — Stn CP 52, 23°06' S, 167°47' E, 540-600 m, 31 August 1985 : 1 ♀ bopyridized (MNHN-NA 12571).

SMIB 2 : stn DW 6, 22°56' S, 167°16' E, 442-460 m, 17 September 1986 : 1 ♀ bopyridized (MNHN-NA 11143).

CHALCAL 2 : stn DW 75, 24°39.31' S, 168°39.67' E, 600 m, 29 October 1986 : 1 ♂ (MNHN-NA 11156).

REMARKS. — Specimens from CP 52, DW6, lack the second pereopods but can be safely identified through the morphology of the rostrum, anterolateral carapace, ambulatory pereopods and telson, which agree well with the data

provided by BALSS (1914) and HOLTHUIS (1952). The larger bopyridized specimen has seven dorsal and two small distoventral rostral teeth. The Siboga Expedition specimen had a rostral dentition of six dorsal and one ventral tooth. The smaller male specimen has the rostrum reaching to the level of the middle of the distal segment of the antennular peduncle, with only five dorsal and a single small ventral tooth. In both specimens the antennal spine is stout, marginal, and far exceeds the inferior orbital angle. The hepatic spine is very robust, anteriorly situated and extends well beyond the anterior margin of the carapace. In the male specimen only the fourth left pereopod is preserved. The propod has a pair of long distoventral spines, about as long as the distal width of the propod, both finely denticulate along the dorsal margin, with five further single simple spines spaced along the ventral border. The dactyl is similar to the figure provided by HOLTHUIS (1952), with the characteristic zone of fine spinules at the base of the unguis. The third pereopod of the larger specimen is generally similar but has two pairs of distoventral spines and six ventral spines. The telson of the larger specimen is rather narrower than in the Siboga specimen, about 3.0 times longer than the anterior width, compared with 2.5 times, with the dorsal and posterior spines more robust. The intermediate dorsal spines are about 0.14 of the telson length, stout, and about 3.0 times the length of the short lateral spines. In the Siboga specimen, they are 0.2 of the telson length, slender, and about 1.8 times the length of the lateral spines. The antennule has the proximal segment strongly produced antero-laterally where the lateral lobe bears a very robust distolateral tooth that reaches to a level of one third of the distal segment. The ventromedial margin bears a very strong tooth at about half its length. The upper flagellum is biramous with the six proximal segments fused, with only two segments on the shorter free ramus; about 9-10 groups of aesthetascs are present. The lamella of the scaphognathite is broad, about 2.3 times longer than the central width and the strong distolateral tooth distinctly exceeds the lamella. The exopod of the uropod is laterally convex and bears a small acute tooth distally with a larger mobile spine medially, not two spines, as in the Siboga specimen.

Previously reported from depths of 120 m

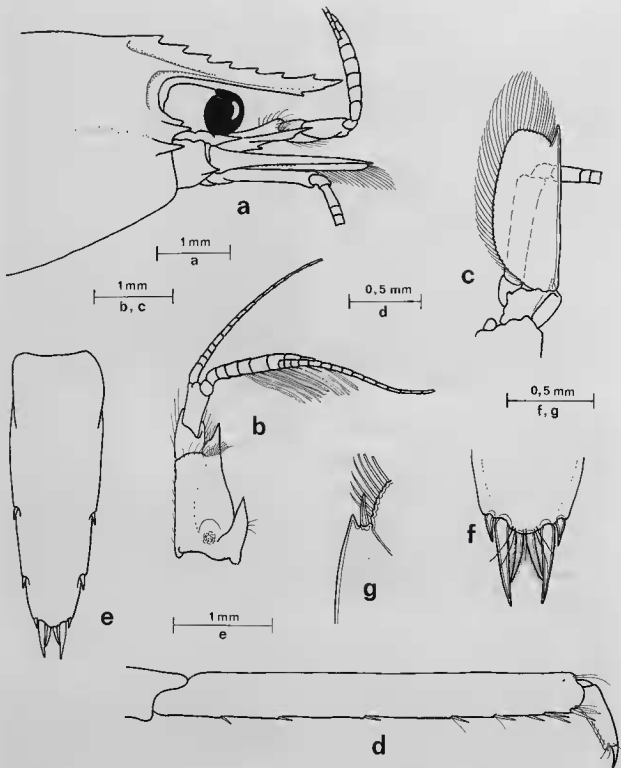


FIG. 1. — *Periclimenes hertwigi* Balss, bopyridized female, stn DW6. a, anterior carapace and rostrum, eye and antennal peduncles. b, antennule. c, antenna. d, third pereiopod, dactyl and propod. e, telson. f, same, posterior spines. g, exopod of uropod, distolateral tooth and spine.

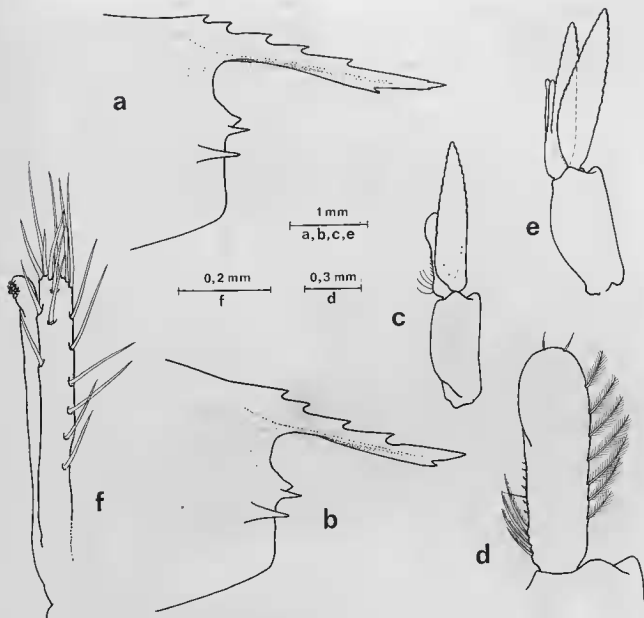


FIG. 2. — *Periclimenes hertvigi* Balss, stn CP 45, a, anterior carapace and rostrum, female. b, same, male. c, male first pleopod. d, same, endopod. e, male second pleopod. f, same, appendix masculina and appendix interna.

(BALSS, 1914) to 275 m (BRUCE, 1972), the present record of a specimen at 600 m represents a considerable extension in the known bathymetric range of this species.

MEASUREMENT (mm). — Carapace lengths; ♂ 4.2; ♀ 2.5.

PARASITE. — *Bopyrinina paucimaculata* Markham (Isopoda : Bopyridae).

DISTRIBUTION. — Type locality, Sagami Bay, Japan. Also known from Kumano-nada, Honshu, Japan; East China Sea; Kei Islands, Indonesia; Queensland, Australia.

Perichimenes parvispinatus sp. nov.

Figs 3-6, 39d

MATERIAL EXAMINED. — New Caledonia. S.W. Récif Jouan, 200 m, trap, 4 March 1977: 1 oviger. ♀, holotype (MNHN-NA 11150).

DESCRIPTION. — A small-sized, moderately robust shrimp of subcylindrical body form.

Carapace smooth, glabrous, with rostrum well developed, equal to about 0.58 of carapace length, depressed, reaching to slightly beyond antennular peduncle, distally acute; teeth all anterior to

posterior orbital margin, except one smaller acute tooth over anterior carapace posterior to orbital margin; lateral carina conspicuous, markedly thickened, particularly proximally, ventral carina obsolete proximally, distinct distally, with single small acute tooth at level of interspace between 7-8th dorsal teeth, distal margin strongly convex, dorsal interdental spaces setose, ventral margin of carina setose proximally to tooth; supraorbital spines absent, orbit feebly developed; inferior orbital angle distinctly produced, blunt, with feeble reflected inner flange; antennal spine small, slender, marginal, not exceeding inferior orbital angle; hepatic spine small, slen-

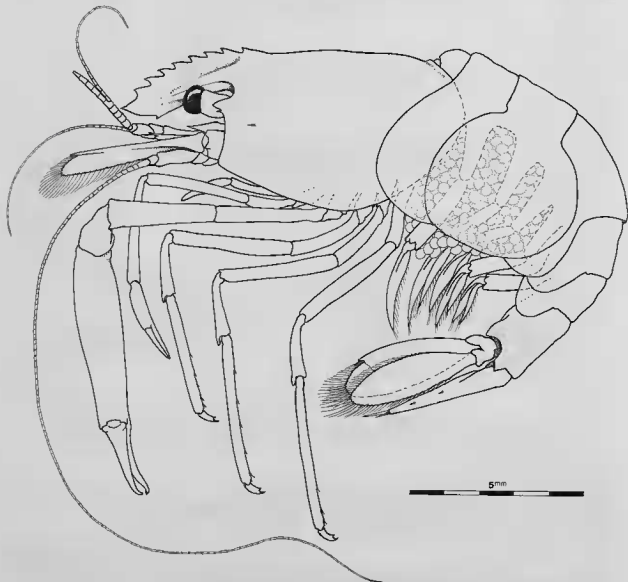


FIG. 3. — *Perichimenes parvispinatus* sp. nov., ovigerous female, holotype, stn CB 2.

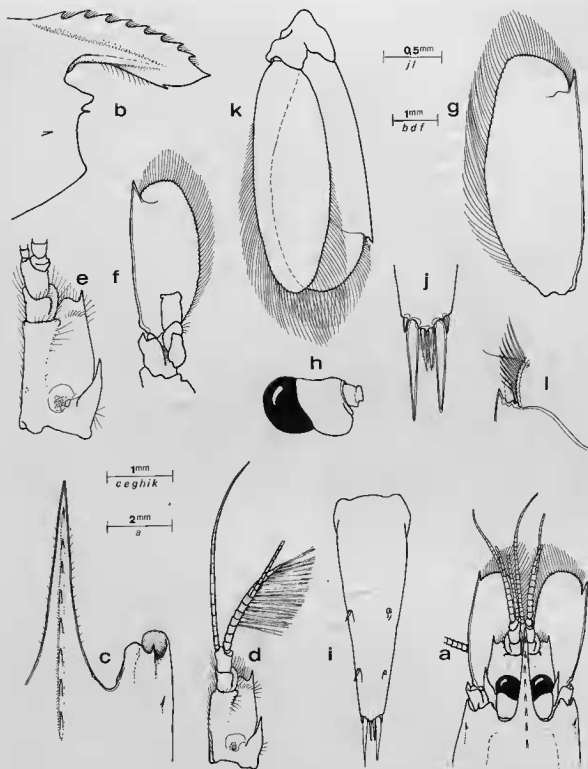


FIG. 4. — *Periclimenes parvispinatus* sp. nov., ovigerous female, holotype. a, anterior carapace, rostrum, eyes, antennae. b, anterior carapace and rostrum, lateral. c, anterolateral carapace and rostrum, dorsal. d, antennule. e, antennular peduncle. f, antenna, ventral. g, scaphocerite. h, eye, dorsal. i, telson. j, same, posterior spines. k, uropod. l, same, exopod, distolateral tooth and spine.

der, similar to antennal, at much lower level, slightly posterior to level of first dorsal rostral tooth; anterolateral angle of carapace not produced, bluntly angular.

Abdominal segments smooth, glabrous; third segment not posterodorsally produced; fifth segment about 0.6 of sixth segment length, sixth segment about 1.5 times longer than deep, with posterolateral angle acute, posteroventral angle stout, less acute; pleura of first three segments enlarged, broadly rounded, fourth and fifth slightly produced posteriorly, rounded. Telson about 1.6 times sixth segment length, about 2.9 times longer than anterior width, tapering posteriorly, lateral margin sub-straight, posterior margin about 0.3 of anterior width, with small central projection with small median point; two pairs of well developed dorsal spines present at 0.5 and 0.8 of telson length; posterior margin with three pairs of spines, lateral spines small, distinctly shorter than dorsal spines, intermediate spines well developed, robust, about 0.22 of telson length, submedian spines about 0.6 of intermediate spine length, slender, setulose.

Eye with large globular, well pigmented cornea, without distinct accessory pigment spot, oblique, diameter about equal to stalk length; stalk slightly compressed, about as long as maximum width.

Antennular peduncle slightly exceeding level of eighth dorsal rostral tooth; proximal segment, about 1.6 times longer than central width, with slender acute stylocerite laterally, reaching to about 0.6 of medial length; anterolateral margin broadly produced with large lobe, anteriorly setose, with short acute distolateral tooth, both reaching to level of proximal margin of distal peduncular segment; ventral medial border with small acute tooth proximally at 0.3 of length; statocyst normally developed, with granular statolith; intermediate and distal segments very obliquely articulated, intermediate segment short, dorsal length about 0.2 of proximal segment length, with broad, setose lateral lobe; distal segment about 0.37 of proximal segment length; upper flagellum biramous, short, about 0.3 of postorbital carapace length, 7 proximal segments fused, shorter free ramus with four segments only, longer ramus with about 23, with about 20 groups of aesthetascs present; lower flagellum very slender, about 0.85 of postorbital carapace length.

Antennal basiscerite with short, stout, subacute lateral tooth; carapocerite short, about 0.28 of scaphocerite length, flagellum about four times carapace length; scaphocerite extending far beyond rostrum and antennular peduncle, exceeding these by almost half its length, broad, about 2.3 times longer than central width, lateral margin feebly convex with stout distolateral tooth reaching level of broadly rounded distal margin of lamella.

Epistome unarmed. Thoracic sternites narrow, fourth sternite without slender median process.

Mouthparts generally, typical of genus. Mandible moderately robust, without palp; molar process normal, with strong blunt teeth and small groups of setae; incisor process distally truncated, with four acute teeth, central pair small, outer teeth unequal. Maxillula with feebly bilobed palp, larger lower lobe with small ventral tubercle with short simple seta; upper lobe slightly expanded, distal margin with 7-8 simple spines and numerous short setae; lower lobe short, tapering, blunt, with numerous setae and slender distal spines. Maxilla with short, slender, nonsetiferous palp, basal endite deeply bilobed, upper lobe distally rounded with about 20 slender simple setae, lower lobe distally oblique, with about 15 setae, with small rounded lobe proximally; coxal endite obsolete, medial margin convex; scaphognathite well developed, about 3.0 times longer than central width, posterior lobe large, anterior lobe narrower. First maxilliped with slender, elongate, nonsetiferous palp, basal endite large, broadly rounded, medial margin moderately setose, setae feebly setulose, coxal endite obsolete; exopod well developed with large caridean lobe, flagellum slender with five plumose distal setae; epipod large, triangular, deeply bilobed. Second maxilliped with endopod of normal form, dactylar segment moderately broad, with numerous serrulate setae medially, propodal segment with anteromedial margin strongly spinose, carpus with small distomedial lobe; exopod slender, with six plumose distal setae; epipod subrectangular, without podobranch. Third maxilliped with endopod moderately robust, extending to about middle of carapocerite, ischio-merus and basis fused, combined segment about 5.3 times longer than central width, uniform, bowed, medial margin with numerous slender setae, lateral margin with about 10 plumose setae

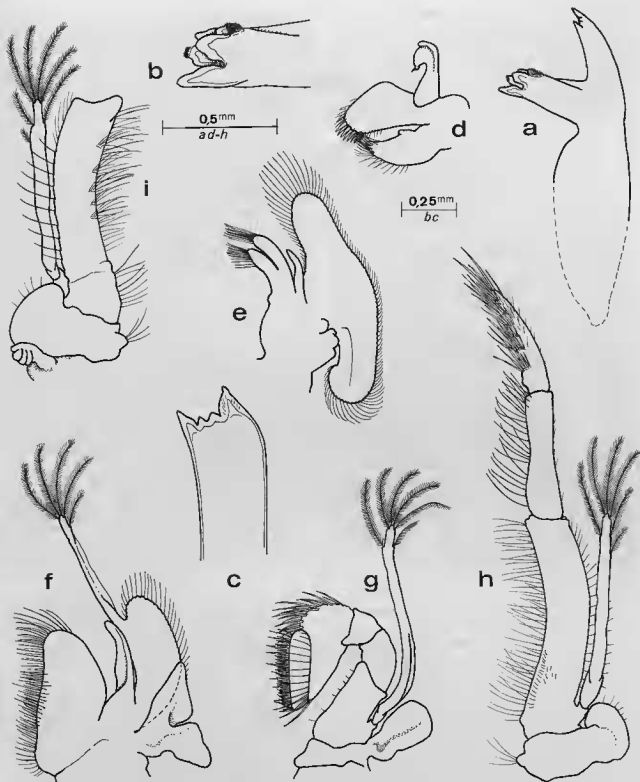


FIG. 5. — *Periclimenes parvispinatus* sp. nov., ovigerous female, holotype. a, mandible. b, same, molar process. c, same, incisor process. d, maxillula. e, maxilla. f, first maxilliped. g, second maxilliped. h, third maxilliped. i, same, ischiomerus-basis and coxal region, dorsal.

along proximal two thirds, numerous short plumose setae submarginally along ventral aspect of proximal half of medial margin; penultimate segment about 0.6 of proximal segment length, about 3.8 times longer than proximal width, tapering slightly distally, with feebly grouped long slender setae medially; terminal segment about 0.9 of penultimate segment length, with long slender simple terminal spine, tapering distally, with about 7 transverse groups of serrulate spines ventromedially; exopod with slender flagellum with 7 plumose distal setae; coxa with small setose medial process, lateral plate rounded; arthrobranch small, with three small lamellae only.

First pereiopod moderately slender, extending anteriorly to exceed carapocerite by carpus and chela. Chela with palm subcylindrical, slightly compressed, about 2.7 times longer than central depth, with six transverse rows of short serrulate cleaning setae proximally; fingers simple, about 0.85 of palm length, tapering, without strongly hooked tips distally, cutting edges situated laterally, mainly entire, but becoming denticulate distally, forming fine laminar palisade of progressively increasing strength, extending round thickened ends of fingers to form small subspatulate tips; carpus about 1.3 times chela length, slender, about 7.0 times longer than distal width, tapered proximally, with several serrulate setae distally; merus slightly longer than carpus, about 6.0 times longer than proximal width, slightly tapering distally; ischium about 0.6 of propod length, ventral margin with setose carina; basis about 0.75 of ischium length, with ventral setose carina; coxa with large linguiform process ventrally.

Major (left) second pereiopod robust, exceeding carapocerite by distal third of carpus and chela. Chela with palm subcylindrical, slightly compressed distally, smooth, about 2.9 times longer than deep; fingers simple, with strongly hooked tips and lateral cutting edge, dactylus about 0.55 of palm length, about 6.7 times longer than deep, distal two thirds of cutting edge entire, proximal third with single large subacute tooth, fixed finger with distal cutting edge entire, proximal four fifths with two irregular teeth separated by diastema for dactylar tooth; carpus short and stout, distally expanded, unarmed, about 0.29 of palm length; merus about 0.62 of palm length, 4.4 times longer than central width, uniform,

with distoventral lateral margin angulate; ischium about 0.88 of merus length, 3.8 times longer than distal width, proximally tapered, unarmed.

Ambulatory pereiopods moderately robust. Third pereiopod exceeds antennular peduncle by about propod and dactyl length; dactyl equal to about 0.15 of propod length, unguis distinct, about 0.5 of corpus length, 3.7 times longer than proximal width; corpus compressed, about 1.8 times longer than proximal depth with acute distoventral tooth, two distolateral and one distomedial setae; propod about 0.75 of carapace length, about 11.5 times longer than proximal width, three pairs of spines distoventrally and four single ventral spines, with numerous simple setae, especially distally; carpus about 0.5 of propod length, unarmed, about 4.0 times longer than central width, moderately tapered proximally, with well marked distodorsal lobe; merus about 0.75 of propod length, about 8.0 times longer than central width, uniform, unarmed; ischium about 0.53 of propod length, sparsely setose ventrally; basis and coxa without special features. Fourth and fifth pereiopods similar to third, fourth propod about 1.2 times as long as third, fifth about 1.3 times, each less strongly spinose ventrally than anterior appendage, fifth with serrulate cleaning setae distally.

Uropod clearly exceeding telson, protopodite with posterolateral angle blunt; exopod broad, about 2.5 times longer than wide, lateral margin feebly convex, with small distolateral tooth with mobile spine medially, diaeresis distinct; endopod about 3.0 times longer than wide, slightly shorter than exopod.

Ova numerous and small.

MEASUREMENTS (mm). — Carapace length, 4.9; carapace and rostrum, 7.8; total body length (approx.) 19.5; right second pereiopod, chela, 6.3; length of ovum, 0.4.

SYSTEMATIC POSITION. — *Periclimenes parvispinatus* is most closely related to *P. lanipes* Kemp, 1922, and shares the following major morphological characteristics: rostrum with deep lamina with eight dorsal and one small ventral tooth, supraorbital spines absent, antennal spine present, eye with globular cornea, first pereiopods without well developed pectinate cutting edges on the fingers, fourth thoracic sternite without median process, second pereiopods with major

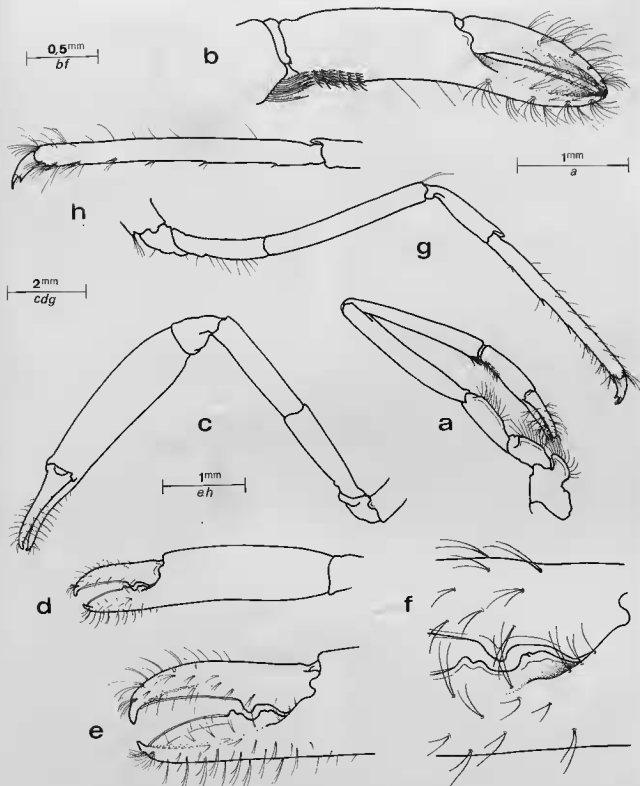


FIG. 6. — *Periclimenes parvispinatus* sp. nov., ovigerous female, holotype. a, first pereiopod. b, same, chela. c, second pereiopod. d, same, chela. e, same, fingers. f, same, proximal region of fingers. g, third pereiopod. h, same, propod and dactyl, medial.

chela robust, merus with distinct distoventral tooth, ambulatory pereopods with simply biunguiculate dactyls. *Periclimenes parvispinatus* may be readily distinguished from *P. lanipes* by the lack of dense setation on the chela of the second pereopods and propods of the ambulatory pereopods, and by the lack of a distoventral tooth on the merus of the ambulatory pereopods. Other differences are that, in *P. lanipes*, the orbit is more strongly developed, the antennal and hepatic spines are robust and situated on the same horizontal level and the posterolateral angle of the uropod is acutely pointed.

ETYMOLOGY. — *Parvus*, small (Latin); *spina* (Latin); in reference to the small hepatic and antennal spines on the carapace.

REMARKS. — *Periclimenes lanipes* has been reported to live in association with gorgonocephalid echinoderms, including *Astroboa*, *Astrogllymna* and *Euryale* species, so that it is probable that *P. parvispinatus* will also prove to be an echinoderm associate in due course. The mouthparts of *P. lanipes* have been described by BRUCE (1971) and show a close similarity to those of *P. parvispinatus*. The maxilla of *P. parvispinatus* has a less robust palp and a narrower scaphognathite than *P. lanipes*, in which the two lobes of the basal endite are unequal instead of subequal, as in *P. parvispinatus*. The first maxilliped has a feeble separation between basal and coxal endites, which is not apparent in *P. parvispinatus* and the palp is comparatively smaller. The exopods of the maxillipeds also appear more strongly provided with plumose setae in *P. parvispinatus* than in *P. lanipes*. In *P. lanipes* the fingers of the first pereopods appear much more distinctly subspatulate than in *P. parvispinatus* but the coxa is provided with a large ventral process as in that species.

In his original description of *P. lanipes*, KEMP (1922) designated a specimen from the Mergui archipelago, in the collection of the Indian Museum, as the type, and reported on two other specimens from Moçambique, in the collections of the Muséum national d'Histoire naturelle, Paris. Recent search (September, 1988) has failed to locate the latter specimens. For comparison with *P. parvispinatus* an illustration (Fig. 7) of another specimen in the collection of the Muséum national d'Histoire naturelle (NA 8160, post-

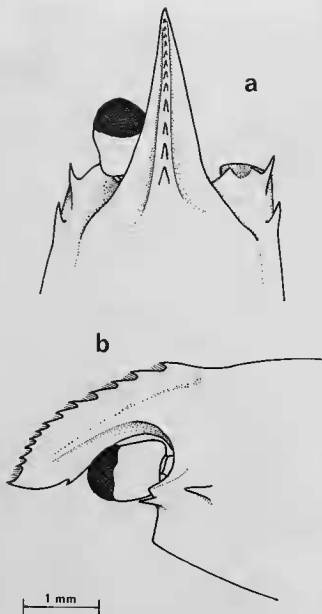


FIG. 7. — *Periclimenes lanipes* Kemp, 1922, ovigerous female, Canal Woodin, New Caledonia, anterior carapace and rostrum, a, dorsal, b, lateral.

orbital carapace length 3.5 mm) is provided, from an ovigerous collected on 26 September 1971 by R. CATALA at Canal Woodin, south of Nouméa, New Caledonia, found in association with a gorgonocephalid, at 25 m depth. The rostrum is much more strongly depressed, with the lateral carina markedly broader and laminar, but less stout than in *P. parvispinatus*. These features are less marked in immature specimens.

Periclimenes fujinoi sp. nov.

Figs 8-11, 39 a-b

MATERIAL EXAMINED. — Chesterfield Islands. MUSORSTOM 5 : stn DW 301, 22°06.9' S, 159° 24.6' E, 487-610 m, 12 October 1986 : 1 ♂, holotype (MNHN-NA 11149).

DESCRIPTION. — A small sized, slenderly built shrimp of subcylindrical body form.

Carapace smooth, glabrous; with rostrum well developed, slender, distal portion lacking, compressed, dorsal carina well developed, proximal portion with five acute teeth, first three semi-articulated, first two situated on carapace posterior to orbital margin; lateral carinae distinct, narrow, ventral carina distinct, proximal portion

unarmed, non-setose; supraorbital spines absent, epigastric spine well developed, fixed, at about 0.4 of carapace length; orbit feebly developed, inferior orbital angle strongly produced, dorsally convex in lateral view, with feeble inner flange; antennal spine marginal, long and slender, reaching to level of anterior margin of inferior orbital angle, (antennal spine lacking on left side and inferior orbital angle abnormal), hepatic spine well developed, at slightly lower level than antennal spine, slightly posterior to level of first dorsal rostral tooth; anterolateral margin of carapace not produced, broadly rounded.

Abdomen smooth, glabrous, slender, relatively elongate; third segment feebly produced posterodorsally, non-carinate; pleura of first three segments small, broadly rounded, pleuron of fourth segment slightly posteroventrally produced,

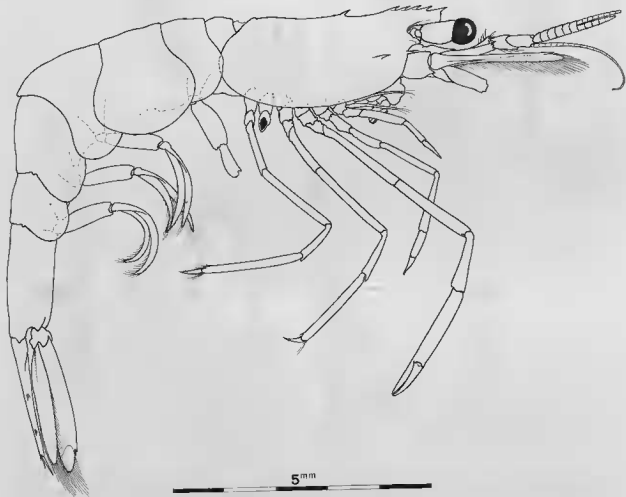


FIG. 8. — *Periclimenes fujinoi* sp. nov., male, holotype, stn 301.

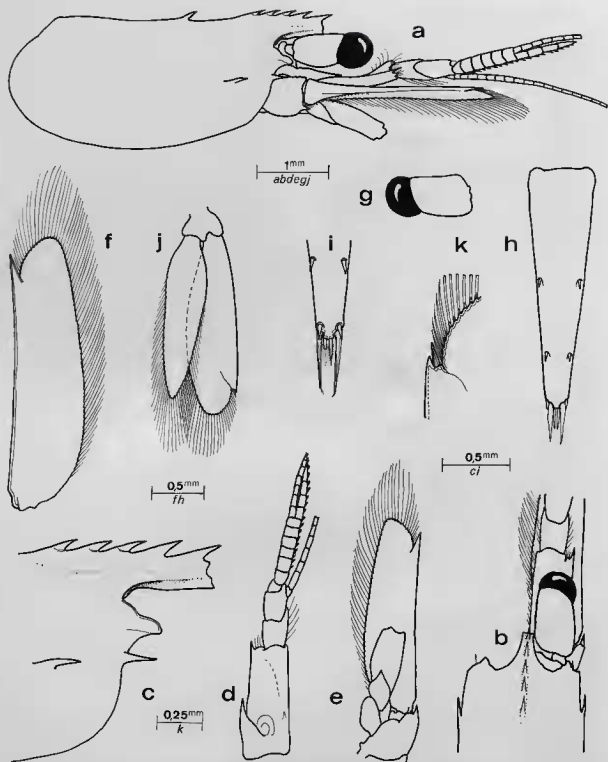


FIG. 9. — *Periclimenes fujinoi* sp. nov., male, holotype. a, carapace, eye and antennae, lateral. b, anterior carapace, right eye and antennal peduncles, dorsal. c, anterolateral carapace, lateral. d, antennule. e, antenna, ventral. f, scaphocerite, dorsal. g, eye. h, telson. i, same, posterior spines. j, uropod. k, same, exopod, distolateral tooth and spine.

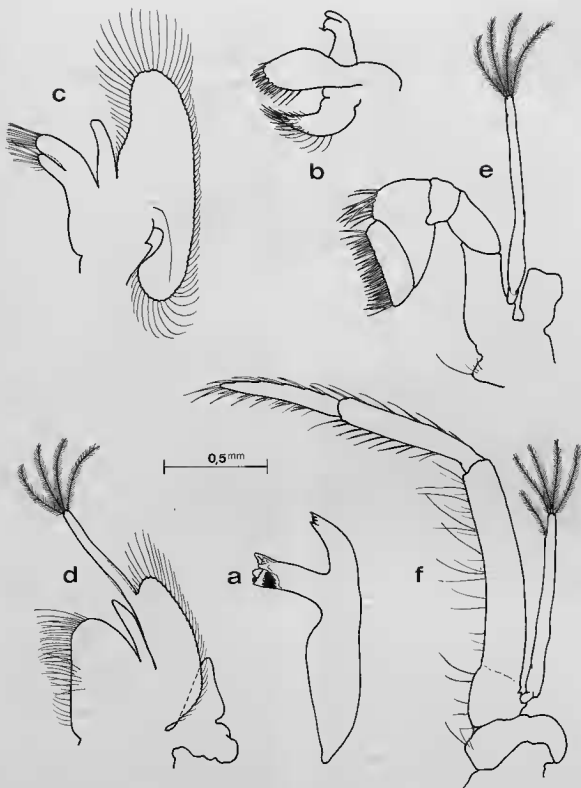


FIG. 10. — *Periclimenes fujinoi* sp. nov., male, holotype. a, mandible. b, maxillula. c, maxilla. d, first maxilliped. e, second maxilliped. f, third maxilliped.

broadly rounded, fifth feebly produced; fifth segment about 0.5 of sixth segment length, sixth segment compressed, about 2.45 times longer than anterior depth, about 0.75 of carapace length, posterolateral angle slightly produced acute; posteroventral angle feebly produced, blunt. Telson about 1.05 times sixth segment length, 3.5 times longer than anterior width, lateral margins straight, convergent, posterior margin about 0.32 of anterior margin width, centrally produced, without acute median point; two pairs of small submarginal dorsal spines at about 0.45 and 0.75 of telson length; three pairs of posterior spines, lateral spines small, similar to dorsal spines, subdorsal, intermediate spines long and slender, about 0.16 of telson length, submedian spines robust, 0.4 of intermediate spine length, sparsely setulose.

Eye with well pigmented globular cornea, slightly oblique, without distinct accessory pigment spot; moderately robust about 1.5 times longer than proximal width, proximal width subequal to corneal diameter, not conspicuously swollen proximally or tapered distally.

Antennular peduncle about 0.75 of carapace length; proximal segment about 2.5 times longer than proximal width; slightly tapered distally, stylocerite slender, acute, reaching to about 0.9 of lateral margin length, statocyst normal, with oval statolith, distolateral angle feebly produced, anterior margin setose, with strong lateral tooth, medial margin straight, with ventral tooth at about 0.33 of length; intermediate segment about 0.27 of proximal segment, about 1.1 times longer than wide, with feeble lateral lobe, larger medial lobe, obliquely articulated with distal segment; distal segment about 0.33 of proximal segment length, 1.5 times intermediate segment length, 1.5 times longer than distal width; upper flagellum biramous, proximal six segments fused, shorter free ramus about 0.9 of fused portion length, four segmented, longer rami incomplete, slender, with about 18 groups of aesthetascs; lower flagella slender, incomplete.

Antenna with basicerite robust, with strong distolateral tooth; carpocerite robust, about 2.4 times longer than central width, reaching to about 0.4 of scaphocerite length, to distal margin of proximal segment of antennular peduncle; flagella lacking; scaphocerite far exceeding antennular peduncle, about 0.9 of postorbital carapace length, 3.7 times longer than broad, maximum

width at about 0.33 of length, lateral margin feebly concave with strong distolateral tooth, anterior margin of lamella strongly produced, bluntly angular medially, far exceeding distolateral tooth.

Ophthalmic segment not enlarged, without "bec ocellaire". Epistome unarmed. Labrum conspicuous. Thoracic sternites anteriorly wide, fourth without slender median process, sixth to eighth narrow.

Mandible (left) normal, corpus slender, without palp; molar process robust with strong blunt upper and lower, inner and outer teeth, with smaller teeth between inner and outer upper teeth, dense band of long setae around outer aspect of lower outer tooth and group of setae between inner and outer lower teeth; incisor process normal, distally oblique with four teeth, outer teeth larger than central pair. Maxillula with bilobed palp, larger lower lobe with small ventral process with short simple seta; upper lacinia slender, tapering, with numerous slender, spinulate spiniform setae. Maxilla with slender, distally blunt, non-setose palp, basal endite bilobed, upper lobe slightly larger, overlapping lower lobe, with sparse simple setae distally, about 12, 10 respectively; coxal endite obsolete, medial margin feebly convex; scaphognathite normal, 3.0 times longer than wide, posterior lobe small, about 0.45 of total length, anterior lobe about 0.45 of length, 1.3 times longer than wide, medial margin feebly concave. First maxilliped with slender elongate, non-setose palp; basal endite broad, sparsely setose distomedially, coxal endite obsolete, exopod with slender flagellum with four plumose distal setae, caridean lobe well developed, elongate; epipod large, triangular, bilobed. Second maxilliped with normal endopod, dactylar segment about 2.8 times longer than wide, densely fringed with strongly serrulate spines medially, propodal segment broad, with about 10 long spiniform, feebly serrulate spines distomedially, carpal segment with small distomedial angle; exopod with slender flagellum, with four plumose distal setae; epipod small, subrectangular, without podobranch. Third maxilliped with endopod slender, reaching to about middle of carpocerite; ischiomerus feebly separated from basis, proximal segment about 5.6 times longer than proximal width, feebly tapering, sparsely setose medially with long simple spiniform seta, penultimate

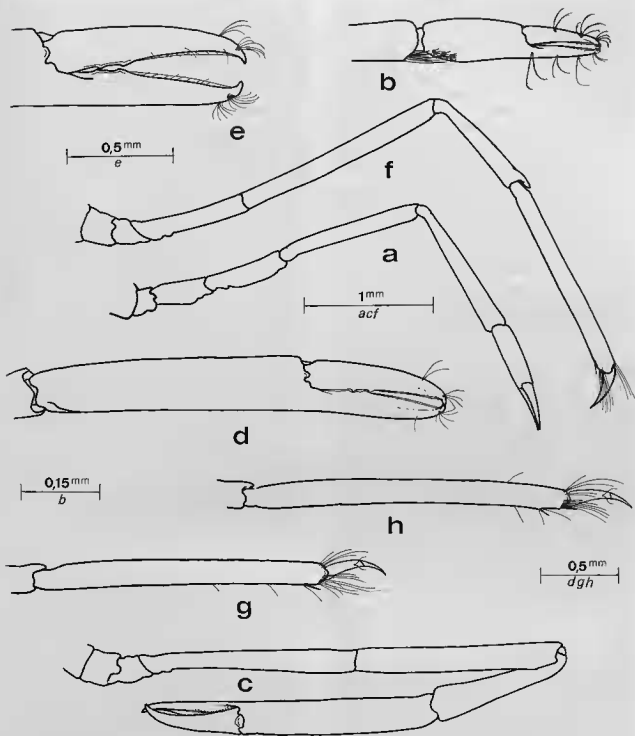


FIG. 11. — *Periclimenes fujinoi* sp. nov., male holotype. a, first pereiopod. b, same, chela. c, second pereiopod. d, same, chela. e, same, fingers. f, third pereiopod. g, same, propod and dactyl. h, same, fingers.

segment about 6.4 times longer than central width, about 0.66 of proximal segment length, subuniform, with slender serrulate spines ventrally, terminal segment slender, tapering, about 0.57 of proximal segment length, 6.0 times longer than proximal width, with several groups of spiniform setae and spines; basal segment medially feebly convex, sparsely setose, about 0.28 of proximal endopod segment length, flagellum with five plumose distal setae; coxa feebly produced medially, sparsely setose, with small oval lateral plate, without arthrobranch.

First pereopod slender, exceeding carpocerite by chela and distal third of carpus; chela with palm subcylindrical, slightly compressed, about 2.3 times longer than maximal width, slightly swollen proximally, with three transverse rows of short serrulate cleaning setae proximovertrally; fingers slender, simple, with strongly hooked tips, cutting edge with distal third sharp laterally, blunt proximally, medially slightly expanded with sparse groups of long setae; dactylus about 4.0 times longer than proximal depth, fixed finger similar; carpus about 1.27 times chela length, about 6.0 times longer than distal width, tapered proximally, with row of serrulate cleaning setae distovertrally; merus about 8.0 times longer than central width, subequal to carpus; ischium about 0.55 of merus length, about 3.7 times longer than width, feebly carinate ventrally, sparsely setose; basis about 0.4 of merus length; coxa simple, without ventromedial process.

Second pereopod (right only preserved) slender, exceeding carpocerite by chela and carpus, scaphocerite by length of chela; chela with carpus subcylindrical, about 0.21 of propod length, smooth, uniform, about 0.75 of carapace length, 4.9 times longer than distal width; dactyl about 0.55 of palm length, about 5.3 times longer than proximal depth, slender, tapering, compressed, with strong acute hooked tip, cutting edge slightly lateral, distal 0.6 of length entire, sharp, proximal 0.4 blunt, with two small subacute slightly recurved teeth proximally; fixed finger similar, with three low blunt teeth proximally, central tooth smaller than proximal and distal teeth; carpus about 0.28 of palm length, 4.5 times longer than distal width, tapered proximally, feebly expanded distally, unarmed; merus subequal to palm length, 7.0 times longer than distal width, subuniform, without distovertrally tooth; ischium about 1.1 times merus length,

about 9.5 times longer than distal width, tapered proximally, unarmed; basis and coxa normal, without special features.

Ambulatory pereopods slender, fourth pereopods missing. Third pereopod exceeds scaphocerite by dactyl; dactyl simple, slightly compressed, unguis distinct, curved, about 0.5 of corpus length, about 6.5 times longer than proximal width, corpus compressed, about 3.3 times longer than proximal depth, without distovertrally accessory tooth, ventral margin entire, concave, with two distolateral and one ventromedial sensory setae; propod about 0.6 of carapace length, 11.5 times proximal depth, greatest width proximally, feebly tapered distally, with single slender preterminal distovertrally spine only, sparsely setose distally; carpus about 0.5 of propod length, 5.3 times longer than distal width, unarmed; merus subequal to propod, about 11.0 times longer than wide, uniform, unarmed; ischium about 0.55 of merus length, 5.0 times longer than distal width, unarmed; basis and coxa without special features.

Male first pleopod with endopod about 0.28 of protopodite length, ovoid, about 4.0 times longer than distal width, with small distomedial lobe, exopod missing. Second pleopod also lacking.

Uropod distinctly exceeding tip of telson, protopodite with distolateral lobe small, rounded; exopod about 3.4 times longer than wide, greatest width at about 0.6 of length, lateral border feebly convex, with small distolateral tooth, with larger mobile spine medially, diaeresis feebly distinct, distal lobe extending well beyond distolateral tooth.

MEASUREMENTS (mm). — Holotype male: carapace length, 3.0; total body length, excluding rostrum (approx.), 14.5; second pereopod chela, 2.33.

SYSTEMATIC POSITION. — Full assessment of the systematic relationships of *P. fujinoi* is prevented by the absence of the major part of the rostrum in the only specimen. It appears most closely related to *P. macrophthalmus* Fujino & Miyake, 1970 also known only from the incomplete holotype specimen, which has a complete rostrum but lacks both of its second pereopods. Major points of resemblance are the absence of a fourth thoracic median sternal process in both species, with the presence of simple dactyls on

the ambulatory pereopods. *P. macrophthalmus* is distinguished from other species of the genus by the slender tapering rostrum and the elongated eyestalk, proximally swollen and strongly tapered distally, with a globular cornea. *P. fujinoi* lacks this characteristic feature, and has a globular cornea on a stalk of feebly tapered proportions. Other features distinguishing *P. fujinoi* from *P. macrophthalmus* are the more strongly produced, dorsally convex inferior orbital angle, with a long slender, coextensive antennal spine, the antennal spine being much smaller in *P. macrophthalmus* and the inferior orbital angle a simple lobe. In *P. macrophthalmus*, the fifth and only ambulatory pereopod has the propod provided with three distoventral pairs of long spines. In *P. fujinoi* only two single simple spines are present distoventrally in this position. In addition, the dactyl is about 0.2 of the propod length in *P. fujinoi*, 0.16 in *P. macrophthalmus*. Other minor differences are that the epigastric spine is at 0.42 of the postorbital carapace length in *P. fujinoi*, 0.36 in *P. macrophthalmus*; the carapocrite reaching to the level of the distal margin of the proximal segment of the antennular peduncle in *P. fujinoi* and only some 0.6 of this length in *P. macrophthalmus*. The smaller antennal spine in *P. macrophthalmus* is submarginal, and not marginal as in *P. fujinoi*, and the lateral carinae are reported to be lacking but are distinct, at least proximally, in *P. fujinoi*. In *P. fujinoi*, the lateral pair of posterior telson spines are distinctly subdorsal in position, and of similar size to the dorsal spines. They appear to occupy a normal position in *P. macrophthalmus*, in which they are also described as minute.

ETYMOLOGY. — The species is named in honour of Dr Takahiro FUJINO, in recognition of his contribution to present knowledge of Indo-West Pacific caridean shrimps

REMARKS. — The systematic position of both *P. fujinoi* and *P. macrophthalmus* in relation to the rest of the species of the genus *Periclimenes* is not particularly clear. *P. fujinoi* in particular, shows some resemblance to members of the *P. aesopius* species group, particularly *P. tosaensis* Kubo, the only species of that group in which the dactyls of the ambulatory pereopods are simple. Members of this group characteristically have an arched rostrum with a strongly pro-

duced inferior orbital angle with which a ridge on the eye stalk may articulate and a well developed ophthalmic segment with a distinct "bec ocellaire". These species also often have a relatively small cephalothoracic region associated with a relatively large abdomen. This feature is shown by *P. fujinoi*, in which the abdominal length is about 2.9 times the postorbital carapace length, cf. 3.5 times in *P. holthuisi* (as *P. aesopius*, in HOLTHUIS, 1952, fig. 5), or 1.8 as in *P. microspinus*.

The related *P. macrophthalmus* is known only from shallower water than *P. fujinoi*, from 145 m, from the East China Sea.

Periclimenes uniungiculatus sp. nov.

Figs 12-15, 39e

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn CP 52, 23°06' S, 167°47' E, 540-600 m, 31 August 1987 : 1 ♂, holotype, pyridized, (MNHN-NA 11155).

DESCRIPTION. — A small, moderately slender shrimp of subcylindrical body form.

Carapace smooth, glabrous, with well developed slender acute compressed rostrum extending well beyond antennal peduncle, about 0.9 times carapace length, slightly exceeding distal scaphocerite, slightly upcurved distally; dorsal carina low, with 9 acute teeth, posterior teeth long and slender, two situated behind posterior orbital margin, becoming shorter and smaller, with increasing interspaces distally, distal tooth small, subterminal; lateral carinae feebly developed; ventral carina distinct, with 3 acute teeth on central third; interdental spaces and proximal ventral carina feebly setose. Supraorbital and epigastric spines absent; orbit feebly developed, inferior orbital angle strongly produced, bluntly round in dorsal view, antennal spine small slender marginal, not exceeding inferior orbital angle, hepatic spine large, slender, below level of antennal spine, below first and second dorsal rostral teeth in lateral view; anterolateral angle of carapace not produced, bluntly rounded.

Abdominal segments smooth, glabrous; third segment grossly produced posterodorsally, ventrally concave, to cover attached parasitic isopod; sixth segment about 2.15 times length of fifth, compressed, about 2.1 times longer than deep,

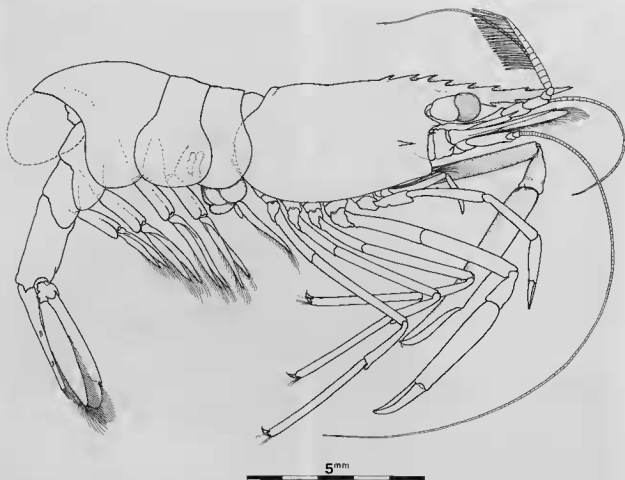


FIG. 12. — *Periclimenes uniunguicatus* sp. nov., bopyrized female, holotype, stn CP 52.

subuniform, posterolateral angle acute, posteroventral angle smaller, less acute; pleura of first three segments small, broadly rounded, fourth posteriorly produced, bluntly rounded; fifth feebly posteriorly produced, blunt. Telson about 1.3 times sixth segment length, about 3.6 times longer than anterior width, lateral margins with anterior third subparallel, posterior two thirds straight, convergent, posterior margin about 0.45 of anterior margin width, angular, with minute posterior median point; two pairs of well developed dorsal spines at 0.44 and 0.75 of telson length; three pairs of posterior spines, lateral spines short, similar to dorsal spines, about 0.05 of telson length, intermediate spines long, slender, about 0.21 of telson length, subme-

dian spines slender, setulose, about 0.5 of intermediate spine length.

Eye with large globular, feebly pigmented cornea, without accessory pigment spot, slightly oblique on stalk; stalk dorsoventrally compressed, width about 1.1 times length, subequal to corneal diameter.

Antennular peduncle reaching to about level of eighth dorsal rostral tooth; proximal segment about 2.0 times longer than central width, with slender acute stylocerite laterally, reaching to about 0.75 of segment length, anterolateral margin feebly produced, setose, with long slender acute lateral tooth reaching to about 0.8 of dorsal length of intermediate segment; statocyst small, with small granular statolith; medial

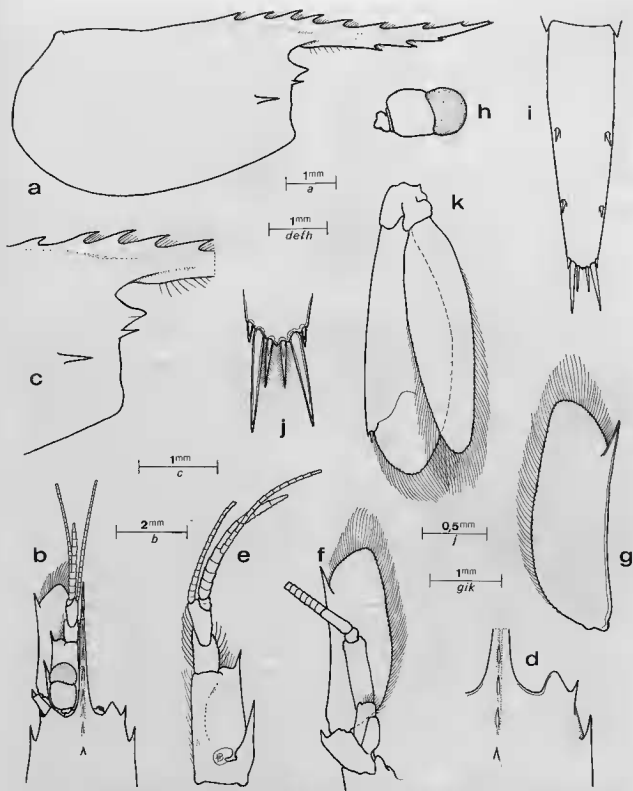


FIG. 13. — *Periclimenes uniuiculatus* sp. nov., female, holotype. a, carapace and rostrum. b, anterior carapace, rostrum, left eye and antennae, dorsal. c, right orbital region, lateral. d, same, dorsal. e, antenna, ventral. f, antenna, ventral. g, scaphocerite, dorsal. h, eye, dorsal. i, telson. j, same, posterior spines. k, uropod.

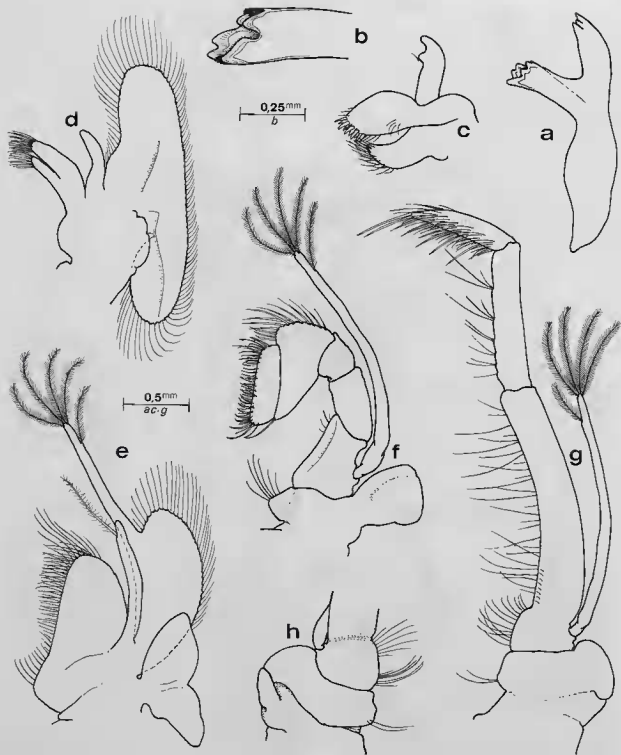


FIG. 14. — *Periclimenes unguiculatus* sp. nov., female, holotype. a, mandible. b, same, molar process. c, maxillula. d, maxilla. e, first maxilliped. f, second maxilliped. g, third maxilliped. h, same, coxal region, lateral.

margin setose, with ventromedial width at about 0.3 of length; intermediate segment obliquely articulated with distal segment, dorsal length about 0.25 of proximal segment length, subequal to width, medial and lateral margins expanded, setose; distal segment about 1.75 times intermediate segment length, 0.4 of proximal segment length, slender, about 2.3 times longer than distal width; upper flagellum biramous, with five proximal segments of rami fused, shorter free ramus with five segments, length about 1.6 times fused portion, total length about 0.5 of carapace length, with about 17 groups of aesthetascs; longer ramus, slender, filiform, about 0.9 times carapace length; lower flagellum slender, filiform, about 1.2 times carapace length.

Antennal basicerite robust, with acute lateral tooth; carapocerate about 0.5 of length of lateral margin of scaphocerite, about 3.3 times longer than width, subcylindrical, exceeding 0.5 of total length of scaphocerite; flagellum well developed, slender, about 3.5 times postorbital carapace length; scaphocerite well developed, distinctly exceeding antennular peduncle, slightly exceeded by tip of rostrum, broad, about 3.0 times longer than wide, greatest width at about 0.3 of length, lateral margin feebly concave, with strong acute distolateral tooth, far outreached by broadly produced distal lamella.

Epistome unarmed. Second and third thoracic sternites broad, unarmed; fourth without slender median process, with low transverse ridge with median notch; posterior sternites narrow.

Mouthparts generally, typical of genus. Mandible with corpus moderately robust, without palp; molar process normal, with four strong blunt teeth, lower inner tooth bilobed; with bands of short setae between upper and lower inner teeth and upper and lower outer teeth; incisor process robust, obliquely truncate distally with three stout acute teeth, central tooth smaller than outer teeth. Maxillula with well developed bilobed palp, upper lobe larger than lower, non-setose, lower lobe with small ventral tubercle with short simple seta; upper lacinia feebly broadened with about 10 short, stout simple spines and scattered setae distally; lower lacinia short, stout, tapered distally, with numerous spiniform setae. Maxilla with short simple non-setose palp; basal endite deeply bilobed, upper lobe stouter than lower, with about 10, 12, short simple setae respectively; coxal endite obsolete,

medial margin convex; scaphognathite well developed, about 3.2 times longer than central width, posterior lobe large, broad, about 0.33 of scaphocerite length, 1.6 times longer than wide, anterior lobe with medial margin concave, about 1.5 times longer than wide. First maxilliped with elongate slender palp with long sub-terminal setulose seta; basal endite broad, with numerous simple spiniform setae medially, fused with coxal endite, coxal margin with sparse long, feebly setulose setae; exopod well developed, caridean lobe large, broad, flagellum slender with five plumose distal setae; epipod large, triangular, feebly bilobed. Second maxilliped with normal endopod, dactylar segment about 3.0 times longer than broad, with numerous serrulate spines medially; propodal segment broad, with distal margin with numerous long finely serrulate spiniform setae; carpus, ischiomerus and basis without special features; coxa angularly produced medially, with five simple setae; exopod with slender flagellum with five plumose setae distally; epipod small, simple, without podobranch. Third maxilliped with slender endopod, extending distally to the middle of the carapocerate, ischiomerus and basis fused, basal portion medially expanded, convex, combined segment length about 6.0 times central width, feebly tapering distally, compressed, sparsely setose medially, with submarginal row of 8-9 short curved spines on proximal medial ischial portion; intermediate segment about 0.6 of combined proximal segment length, 5.0 times longer than central width, with several groups of long finely serrulate spiniform setae medially; terminal segment about 0.4 of combined proximal segment length, distally tapering, about 5.0 times longer than proximal width, with numerous dense transverse rows of coarsely serrulate spines medially, with long distal spines; endopod with slender flagellum with five plumose setae distally; coxa feebly produced medially, with oval lateral plate; arthrobranch rudimentary.

First pereopods moderately slender, exceeding tip of rostrum by length of fingers; chela with palm subcylindrical, slightly compressed, feebly tapered distally, about 3.4 times longer than maximal depth, at about 0.3 of length, with several transverse rows of short cleaning setae proximoventrally; fingers about 0.65 of palm length, slender, tapering, subcylindrical, with

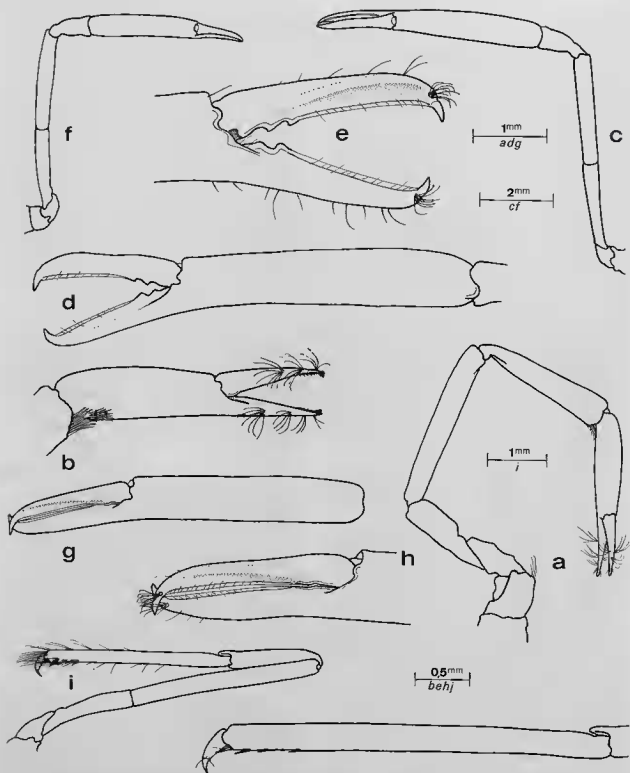


FIG. 15. — *Periclimenes uniunguiculatus* sp. nov., female, holotype. a, first pereiopod. b, same, chela. c, major second pereiopod. d, same, chela, fingers. e, same, fingers. f, minor second pereiopod. g, same, chela. h, same, fingers. i, third pereiopod. j, same, propod and dactyl.

feebly developed cutting edges over distal fourth, tip strongly hooked, base slightly expanded, surrounded by palisade of short curved setae, with numerous groups of long serrulate setae medially and laterally, carpus about 0.85 of chela length, 4.6 times longer than distal width, tapering proximally, with 7-8 serrulate cleaning setae distoventrally; merus about 1.05 times chela length, 7.0 times longer than central width, uniform; ischium subequal to palm length, 0.55 of merus length, 3.5 times longer than distal width, not strongly carinate distoventrally, obliquely articulated with basis; basis about 0.5 of carpus length; coxa without ventromedial process.

Second pereopods well developed, generally similar, unequal. Major (left) second pereopod exceeding carpocerite by chela, carpus and distal 0.2 of merus; chela about 1.35 times carapace length, palm smooth, subcylindrical, slightly compressed, swollen proximally, about 5.2 times longer than maximal depth, fingers about 0.5 of palm length, with stout hooked tips, distal 0.75 of cutting edges entire, sharp; dactylus about 5.5 times longer than proximal depth, with feebly developed lateral flange, two small acute, slightly recurved teeth on proximal fourth of cutting edge, proximal tooth slightly larger than distal; fixed finger similar, without lateral flange, teeth blunt, simple, distal tooth larger; carpus about 0.33 of palm length, 2.0 times longer than distal width, feebly excavate distally, proximally tapered, unarmed; merus about 0.75 of palm length, subuniform, about 6.5 times longer than distal depth, unarmed, without distoventral tooth; ischium about 0.57 of palm length, 0.77 of merus length, 5.0 times longer than distal width, proximally tapered, unarmed; basis and coxa normal. Minor (right) pereopod exceeding carpocerite by carpus and chela; about 1.05 times postorbital carapace length, 0.8 times length of major chela; palm about 5.4 times longer than maximal depth; fingers about 0.55 of palm length, with strongly hooked tips, cutting edges entire, sharp, with feeble dentition proximally; dactylus about 6.3 times longer than proximal depth, with feebly developed lateral flange, carpus about 2.4 of palm length, merus unarmed, about 0.88 of palm length, 1.25 of ischial length; basis and coxa normal.

Ambulatory pereopods slender. Third pereopod exceeds carpocerite by propod and dactyl; dactyl short, compressed, strongly curved, about

0.12 of propod length, unguis distinct, articulated, about 0.5 of dorsal length of corpus, corpus about 2.3 times longer than proximal depth, ventral margin straight, unarmed, without distal accessory tooth, with two distolateral sensory setae; propod about 0.74 of carapace length, 13.75 times longer than wide, uniform, with pair of long simple distoventral spines, 3 single spines on distal 0.2 of ventral margin, closely adpressed to ventral border, largely obscured by transverse rows of long setae distolaterally; carpus about 0.5 of propod length, 5.0 times longer than distal width, unarmed; merus subequal to propod length, 11.0 times longer than wide, uniform, unarmed; ischium subequal to carpus length, 0.5 of merus length, 5.3 times longer than distal width, proximally tapered; basis and coxa without special features. Fourth and fifth pereopods similar to third, fourth propod subequal, fifth propod 1.1 times third propod length, less strongly spinose distoventrally; fifth with transverse rows of cleaning setae distolaterally.

Uropod distinctly exceeding telson; protopodite with posterolateral angle short, blunt; exopod 3.0 times longer than central width, lateral border feebly convex, with small acute distal tooth, with large mobile spine medially, diaeresis distinct; endopod about 0.9 of exopod length, 3.6 times longer than wide.

MEASUREMENTS (mm). — Carapace length, 4.4; carapace and rostrum, 8.5; total body length (approx.), 21.5; chela of major second pereopod, 5.8; chela of minor second pereopod, 4.75.

COLOURATION. — The alcohol bleached specimen still showed distinct traces of orange red colouration on the finger tips of the chelae of the second pereopods and on the dactyls and distal propods of the ambulatory pereopods.

PARASITES. — Isopoda: Bopyridae. (i) Dorsal abdominal, *Filophryxus dorsalis* Bruce, 1972. (ii) Ventrolateral abdominal, Hemiarthrinae. (iii) Unattached, Hemiarthrinae, unidentifiable.

SYSTEMATIC POSITION. — In its general morphology, *Periclimenes uninguiculatus* shows a close resemblance to *P. laccadivensis* (Alcock & Anderson, 1894) and *P. latipollex* (Kemp, 1922). It can immediately be distinguished from both

these species, and most other deep-water species of the genus *Periclimenes*, by the presence of a non-biunguiculate dactyl on the ambulatory pereopods. Apart from the ambulatory dactyls, *P. uniuugiculatus* is intermediate between these two species. It has a feebly developed lateral flange on the second pereopod dactyl, whereas this is absent in *P. laccadivensis* but well developed in *P. latipollex*. Similarly, the rostrum is longer and shallower than in *P. laccadivensis* where it fails to exceed the antennular peduncle, but is not as long and slender as in *P. latipollex*.

ETYMOLOGY. — *Unus*, one, single (Latin); *unguiculus*, little nail (Latin); with reference to the morphology of the dactyls of the ambulatory pereopods.

REMARKS. — Captured at a depth of 600 m, *P. uniuugiculatus* occurs in shallower depths than *P. laccadivensis*, which has been reported from the Laccadive Sea and off Hawaii, at 700-1 265 m, but from deeper water than *P. latipollex*, from the Mergui Archipelago and Kei Islands, at 112-304 m (HOLTUIS, 1952).

The single example is also noteworthy for its associated bopyrid isopod parasites. The dorsal abdominal male-female pair and the right ventrolateral female, were found in situ but the two juvenile specimens were found detached during the course of examination. The larger juvenile was found loose against the ventral thoracic region, enclosed by the folded pereopods and the smaller juvenile was found loose when the maxillipeds were removed from the left side of the host.

Periclimenes vaubani sp. nov.

Figs 16-19, 38 a-d, 39 g

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn CP 78, 26°16' S, 167°15' E, 445-450 m, 5 September 1985 : 1 ♀, bopyridized (MNHN-NA 11151).

CHALCAL 2 : stn DW 72, 24°54.5' S, 168°23.3' E, 527 m, 28 October 1986 : 1 ♂, 3 ♀, paratypes (MNHN-NA 11153 and NA 11154). — Stn DW 74, 24°40.3' S, 168°38.38' E, 650 m, 29 October 1986 : 1 ♀, paratype (MNHN-NA 11145).

SMIB 3 : stn DW 12, 23°38' S, 167°42' E, 470 m, 22 May 1987 : 1 ovig. ♀, holotype (MNHN-NA 11141).

DESCRIPTION. — A small sized, slenderly built shrimp of subcylindrical body form.

Carapace smooth, glabrous, with rostrum well developed, slender, acute, straight, horizontal, reaching to about distal end of intermediate antennular peduncular segment; dorsal carina well developed, proximally elevated over orbital region, with 8-9 acute teeth, largest over orbit, decreasing in size distally, first tooth small, situated on carapace posterior to orbital margin, separated from second tooth by larger gap than between rest of teeth, first and second teeth semiarticulated, interdental spaces setose; lateral carina distinct, narrow; ventral carina distinct, straight, non-setose, with two small acute teeth distally, distal tooth sometimes minute; supra-orbital spines absent, epigastric tubercle small, without epigastric tooth; orbit obsolete, inferior orbital angle broadly produced, with small flange, antennal spine small, slender, marginal, not exceeding inferior orbital angle, hepatic spine large, acute, situated at much lower level than antennal spine, anterior to level of first dorsal rostral tooth; anterolateral angle of carapace not produced, obtuse, blunt.

Abdomen smooth, glabrous; third segment not posterodorsally produced, pleura of first three segments broadly rounded, enlarged in ovigerous female, fourth strongly posteriorly produced, rounded, fifth feebly produced, rounded; fifth segment about 0.45 of sixth segment length, about 2.8 times longer than deep, posterolateral angle acute, posteroventral angle feebly produced, small, acute. Telson subequal to sixth abdominal segment length, about 4.4 times longer than anterior width, lateral margins subparallel for proximal third, convergent distally, posterior margin about 0.4 of anterior width, angular, with median process, lacking acute postero-median point; two pairs of small submarginal dorsal spines at about 0.5 and 0.8 of telson length; three pairs of posterior spines, lateral spines small, similar to dorsal spines, intermediate spines large, about 0.18 of telson length, submedian spines small, short, about 0.33 of intermediate spine length, setulose on inner margin only.

Eye with large well pigmented globular cor-

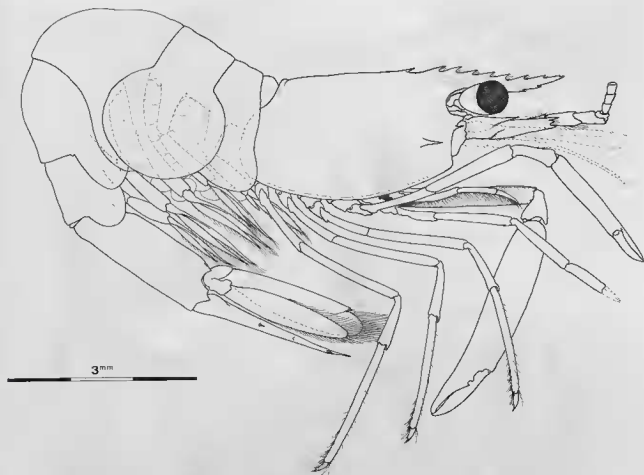


FIG. 16. — *Periclimenes vaubani* sp. nov., ovigerous female, holotype, stn DW 12.

nea, without distinct accessory pigment spot, diameter subequal to distal width of stalk; stalk about 1.2 times wider than dorsal length, uniform.

Antennule with peduncle exceeding rostrum by length of distal segment, exceeded by scaphocerite; proximal segment about 2.2 times longer than wide, with slender acute stylocerite reaching to about 0.6 of length, statocyst normally developed with circular statolith; medial margin straight, sparsely setose, with acute ventral tooth at about 0.5 of length, lateral margin straight, subparallel to medial, distolaterally produced, with setose inner lobe with acute tooth laterally, extending beyond distal margin of lobe, intermediate segment with dorsal length about 0.25 of proximal segment length, with well developed lateral lobe, plumose setae medially and laterally, obliquely articulated with distal segment; distal

segment about 0.33 of proximal segment length, 1.75 times longer than wide; upper flagellum biramous, proximal four segments stout, fused, shorter free ramus with three segments, 10-13 groups of aesthetascs, longer ramus slender, 14 + segments; lower flagellum slender, filiform, about subequal to carapace length.

Antenna with basicerite robust, with small acute lateral tooth; carpocerite short, robust, about 2.5 times longer than central width, reaching to about 0.4 of scaphocerite length; flagella broken, apparently long; scaphocerite extending well beyond antennular peduncle, about 3.1 times longer than central width, broad throughout length, feebly tapering distally, distal margin rounded, lateral margin straight, with stout acute distal tooth, slightly exceeded by distal margin of lamella.

Epistome normal, unarmed. Thoracic sternites

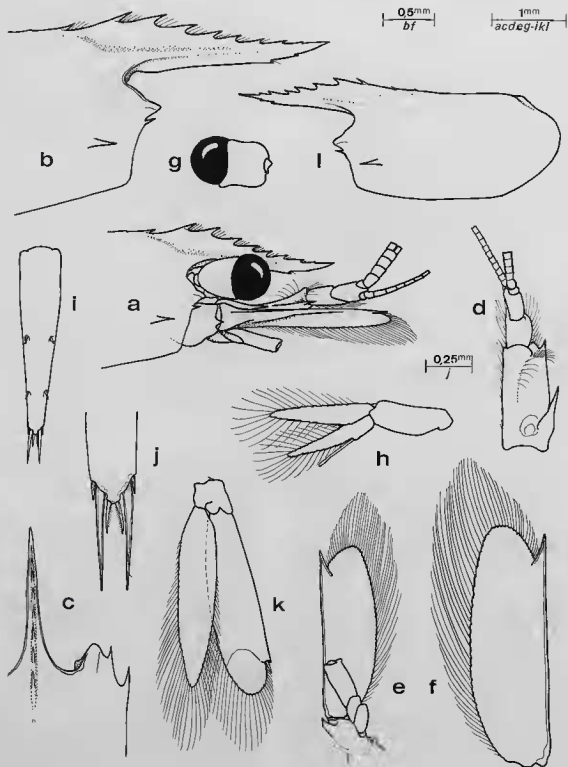


FIG. 17. — *Periclimenes vaubani* sp. nov., paratype female and paratype male. a, anterior carapace and rostrum, eye and antennal peduncles, lateral. b, anterolateral carapace and rostrum, lateral. c, rostrum and right orbital region, dorsal. d, antennule. e, antenna, ventral. f, scaphocerite, dorsal. g, eye, dorsal. h, first pleopod. i, telson. j, same, posterior spines. k, uropod. l, carapace and rostrum. a-k, female; l, male.

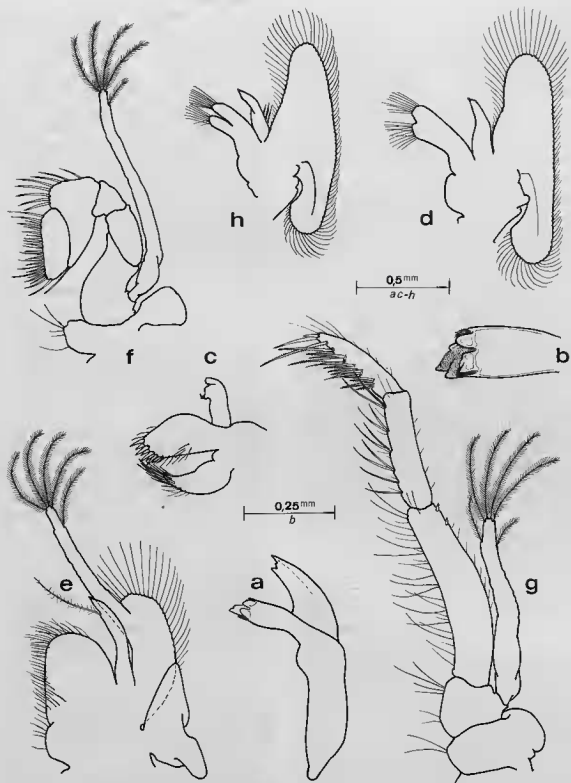


FIG. 18. — *Periclimenes vaubani* sp. nov., paratype female. a, mandible. b, same, molar process. c, maxillula. d, maxilla. e, first maxilliped. f, second maxilliped. g, third maxilliped. h, paratype male, maxilla.

narrow, fourth sternite without slender median process.

Mandible normally robust, without palp; molar process (right) slender, upper and lower outer teeth well developed, with setose fringes, upper and lower inner teeth covered with small scale-like tubercles; incisor process normal, with three acute teeth distally, central tooth smaller than outer teeth. Maxillula with palp bilobed, larger lower lobe with short simple seta, upper lacinia not broadened, tapered distally with about 8 simple spines distally and scattered setae, lower lacinia slender, tapered with numerous spiniform setae distally. Maxilla with tapering palp, distally acute, with short plumose setae proximolaterally, basal endite deeply bilobed, upper lobe slightly larger than lower, sparsely setose, about 8, 10 setae respectively, coxal endite obsolete, medial margin convex; scaphognathite well developed, broad, about 1.7 times longer than wide, posterior lobe about 0.35 of scaphognathite length, anterior lobe about 1.25 times longer than broad. First maxilliped with elongate slender distally acute palp, with long setulose preterminal seta; basal endite large, broad, sparsely setose distomedially; coxal endite distinct, convex, sparsely setose; exopod with normal flagellum with five plumose distal setae, caridean lobe well developed broad; epipod large, triangular, bilobed. Second maxilliped with normal endopod, dactylar segment broad, about 2.5 times longer than wide, with numerous long spines medially, propodal segment broad, with long spiniform setae distomedially, carpus with small medial lobe; exopod with normal flagellum with five plumose distal setae; coxa strongly produced medially, sparsely setose; epipod small, trapezoidal, without podobranch. Third maxilliped with endopod slender, reaching to about proximal third of carpoцерite, ischiomerus distinct from basis, about 4.5 times longer than wide, bowed, feebly tapered distally, medial margin with sparse long setae, with submarginal row of short plumose setae proximally, lateral margin sparsely setose, with two small peg-like spines distally; penultimate segment about 0.65 of ischiomerus length, about 4.0 times longer than wide, uniform, with few small groups of long spiniform setae medially; terminal segment about 0.55 of ischiomerus length, tapering distally with short stout simple distal spine, medial margin with about six groups of serrulate spines; basis with

medial margin convex, sparsely setose, exopod with robust flagellum with six plumose distal setae; coxa feebly produced medially, sparsely setose, with small oval plate laterally, without arthrobranch.

First pereiopod slender, exceeding carpoцерite by distal third of chela; chela with palm subcylindrical, slightly compressed, about 3.25 times longer than deep, with three transverse rows of short serrulate cleaning setae proximally; fingers slender, with strongly hooked acute tips, cutting edges with distal two thirds entire, about 0.6 of palm length, dactylus about 4.2 times longer than proximal width, with numerous groups of long setae, fixed finger similar; carpus about 1.05 times chela length, 5.2 times longer than distal width, slightly tapered proximally with transverse row of long serrulate cleaning setae distoventrally, unarmed; merus about 1.15 times chela length, 6.5 times longer than maximum width, slightly swollen centrally, unarmed; ischium 0.7 of chela length, 3.75 times longer than distal width, tapered proximally, obliquely articulated with basis; basis about 0.4 of chela length; coxa about 0.32 of chela length, with small distoventral process.

Second pereiopods, well developed, slender, unequal, dissimilar. Major second pereiopod (female) extends beyond carpoцерite by chela and distal third of carpus; chela smooth, glabrous, about 1.33 times carapace length, subcylindrical, slightly compressed, proximally swollen, feebly curved, about 4.4 times longer than maximal width, at 0.33 of length; fingers equal to 0.37 of palm length, with stout strongly hooked tips, sparsely setose, distal cutting edges sharp, entire; dactylus about 3.75 times longer than proximal depth, compressed, with single stout acute slightly recurved tooth at about 0.25 of length; fixed finger similar, with two subacute teeth on proximal half of cutting edge, separated by narrow U-shaped notch, closing laterally to dactylar tooth; carpus short, stout, distally expanded, unarmed, about 1.4 times longer than distal width, 0.25 of palm length; merus about 2.2 of palm length, 5.2 times longer than distal width, slightly tapered proximally, unarmed; ischium about 0.5 of palm length, 0.83 of merus length, 5.0 times longer than distal width, unarmed, obliquely articulated with basis; basis about 0.37 of ischial length, coxa without special features. Minor second pereiopod (female) exceeds carpo-

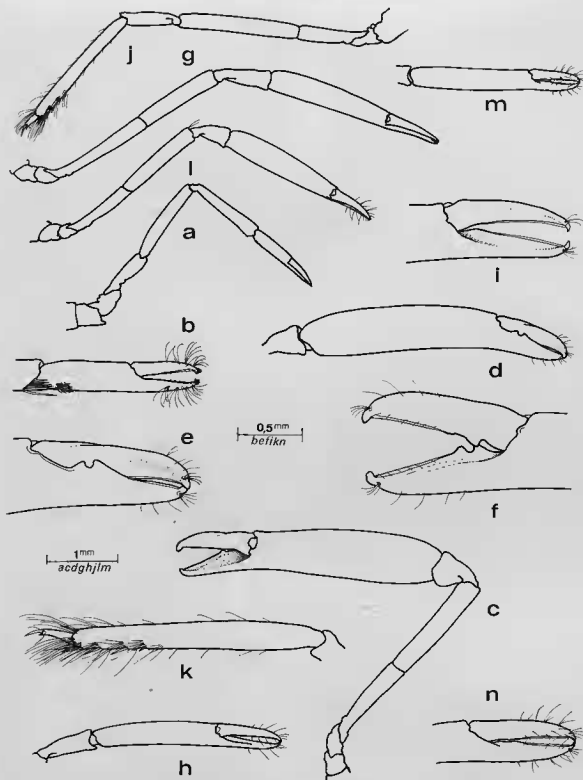


FIG. 19. — *Periclimenes vaubani* sp. nov., paratype female and paratype male. a, first pereopod. b, same, chela. c, major second pereopod. d, same, chela. e, same, fingers, lateral. f, same, medial. g, minor second pereopod. h, same, chela. i, same, fingers. j, third pereopod. k, same, propod and dactyl. l, second pereopod. m, same, chela. n, same, fingers. a-k, female; l-n, male.

cerite by distal half of carpus, about 0.82 of carapace length, 0.12 of major chela length; chela subcylindrical, smooth, feebly bowed, about 5.7 times longer than central width; fingers about 0.45 of palm length, slender, with acute hooked tips, cutting edges sharp, entire; dactylus about 4.2 times longer than proximal depth, fixed finger similar; carpus about 0.45 of palm length, 2.0 times longer than distal width, unarmed, proximally tapered; merus about 0.68 of palm length, 5.0 times longer than distal width, uniform, unarmed; ischium about 0.88 of palm length, 1.33 times meral length, 7.5 times longer than distal width; basis and coxa normal. Minor(?) male second pereopod with chela subequal to carapace length, palm subcylindrical, about 5.5 times longer than central width; fingers about 0.4 of palm length, slender, simple, with small acute hooked tips, cutting edges sharp over distal two thirds, entire, dactylus about 4.8 times longer than proximal depth, fixed finger similar; carpus 0.33 of palm length, unarmed; merus 0.7 of palm length, 5.2 times longer than distal width, unarmed; ischium about 0.6 of palm length, 0.85 of merus length; basis and coxa without special features.

Ambulatory pereopods slender. Third pereopod exceeds carapace by dactyl and 0.9 of propod; dactyl slender, about 0.21 of propod length, unguis distinct, slender, simple, feebly curved, about 7.0 times longer than proximal width, corpus compressed, slender, about 3.0 times longer than proximal, depth, with strong acute distoventral accessory tooth, ventral margin entire, feebly concave, with two sensory setae distolaterally, one medially; propod about 0.65 of carapace length, 9.0 times longer than wide, strong distoventral spine, three similar spines, size decreasing proximally, along distal third of ventral margin, with 5-6 oblique transverse rows of long setae distolaterally; carpus about 0.4 of propod length, 3.75 times longer than distal width, unarmed; merus about 0.9 of propod length, 7.5 times longer than wide, uniform, unarmed; ischium about 0.55 of propod length, 0.6 of meral length, 4.3 times longer than distal width; basis and coxa without special features. Fourth and fifth pereopods similar; fourth pereopod 1.06 times third, fifth 1.23 times.

Male first pleopod with basipodite about 2.5 times longer than broad; exopod 1.2 times longer than basipodite, 5.0 times longer than

proximal width; endopod about 0.5 of basipodite length, 3.75 times longer than proximal width, feebly tapering, bluntly angular distally with small distomedial lobe, lateral margin with four feebly plumose setae on distal half, medial margin with three densely plumose setae proximally, two small spinules distally on proximal half. Second pleopod with basipodite about 0.8 of length of first, 2.6 times longer than wide; exopod 1.2 times longer than basipodite, 4.8 times longer than wide; endopod subequal to basipodite length, 4.0 times longer than wide, with appendices at about 0.3 of length; appendix masculina with corpus slightly swollen, reaching to about 0.5 of endopod length, 3.3 times longer than wide, with three long densely spinulose distal spines, longest about 1.6 times corpus length, three short simple distoventral spines; appendix interna slender, reaching to 0.75 of endopod length, 2.0 times appendix masculina length, with about 8-10 distal concinnuli; female endopods with elongated appendix interna, about 0.5 times length of endopod, slender, with few distal concinnuli only.

Uropod exceeds tip of telson; protopodite with posterolateral lobe rounded; exopod slender, about 3.75 times longer than central width, lateral margin straight with small distolateral tooth, with larger mobile spine medially, diaeresis distinct, distal lobe rounded, extending well beyond distolateral spine; endopod slender, 4.5 times longer than central width, about 1.05 times endopod length.

MEASUREMENTS (mm). — Holotype, ovigerous female: carapace length, 2.7; carapace and rostrum, 4.6; total body length (approx.), 16.0; chela of major second pereopod, 3.6; chela of minor second pereopod, 2.5; length of ovum, 0.6. Paratype females, carapace lengths, 3.3 (bopyridized), 3.1, 2.75. Male allotype, carapace length, 2.3; male paratype, 2.4.

COLOURATION. — Male allotype specimen bleached, but with strong orange red tint on dactyls and propods of ambulatory pereopods.

PARASITES. — *Eophryxus obesus* Markham (Isopoda: Bopyridae), ventral abdominal, specimen from stn CP 78.

SYSTEMATIC POSITION. — *Periclimenes vaubani* is most closely related to *P. coriolis* Bruce,

another deep water species, known only from the female holotype specimen from 186-184 m off Luzon, Philippines (BRUCE, 1985). The two species may be readily distinguished by the lack of a raised proximal dorsal rostral carina, with a generally deeper rostrum, the larger antennal spine with a smaller hepatic spine placed on an only slightly lower level in *P. coriolis*. *P. vaubani* also lacks the characteristic dense setation that covers the pereopods in *P. coriolis*. The posterior telson spines in *P. vaubani* are also distinctly larger than in *P. coriolis*. The fingers of the first pereopod are much shorter than the palm length in *P. vaubani*, but subequal in *P. coriolis*. The mouthparts are essentially similar in the two species and in both, the occlusal surface of the molar process is characteristically tuberculate. In *P. vaubani*, the epipod of the first maxilliped is triangular and feebly bilobed, in *P. coriolis*, deeply bilobed, with rounded lobes. The second maxilliped has a short, trapezoidal epipod in *P. vaubani*, but is slender and elongate in *P. coriolis*. The third maxillipeds are similar but a small arthrobranch is present in *P. coriolis* but was not observed in *P. vaubani*. The dactyls and propods of the ambulatory pereopods are essentially similar, but in *P. coriolis* spines are present along the whole length of the ventral border of the propod, but only on the distal third in *P. vaubani*.

ETYMOLOGY. — The species is named after the N.O. « Vauban », the ORSTOM research vessel that collected many of the New Caledonian samples upon which the present report is based.

REMARKS. — In the dissected female paratype (stn DW 72) the maxilla showed an abnormal basal endite with the two lobes almost fully fused and only sparsely setose. The maxilla of a male paratype (stn DW 74) was also examined and is considered normal, with a deeply bilobed basal endite. In the bopyridized female specimen (stn DW 72), the parasites were not present *in situ*.

Periclimenes richeri sp. nov.

Figs 20, 39 f

MATERIAL EXAMINED. — New Caledonia. CHALCAL 2 : stn DW 72, 24°54.5' S, 168°23.3' E, 527 m, 28 October 1986 : 1 ovig. ♀, holotype (MNHN-NA 11142).

DESCRIPTION. — In general morphology, closely similar to *P. vaubani* (*vide supra*).

Carapace smooth, glabrous; rostrum well developed, about 0.7 of carapace length, distinctly exceeding antennular peduncle, dorsal carina well developed, with 9 acute teeth, size diminishing distally, first tooth situated posterior to orbital margin, semiarticulated, distal tooth very small; lateral carinae distinct, narrow; ventral carina well developed, lower margin convex, non-setose, with one very small distal tooth, between level of eighth-ninth dorsal teeth; supraorbital spines absent, epigastric tubercle present; orbit obsolete, inferior orbital angle well developed, produced, antennal spine robust, acute, marginal, directed dorsally, hepatic spine well developed. Abdomen, as in *P. vaubani*.

Antennule, as in *P. vaubani*. Antenna with basicerite with acute lateral tooth; carpoцерite exceeds half length of lateral border of scaphocerite; scaphocerite well developed, 3.0 times longer than broad, lateral margin straight, with strong distolateral tooth, anterior margin of lamina strongly produced, far exceeding distolateral tooth. Eye with cornea globular, well pigmented, without accessory pigment spot; stalk about 1.3 times wider than long, 1.1 times wider than corneal diameter.

Mouthparts not examined.

First pereopod slender, chela subcylindrical, moderately compressed, about 2.7 times longer than deep, with two rows of short cleaning setae proximally; fingers slender, subequal to palm length, as in *P. vaubani*; carpus about 1.6 times chela length, 7.5 times longer than distal width, slightly narrowed proximally; merus about 0.95 of carpus length, 8.0 times longer than wide proximally; ischium about 0.95 of chela length; basis and coxa normal, coxa with small setose ventromedian process.

Major second pereopod well developed, exceeding antennular peduncle by carpus and chela; chela with palm subcylindrical, smooth, glabrous, slightly compressed, about 3.5 times longer than proximal width; fingers slender with strongly hooked tips, distal halves of cutting edges sharp, entire; dactylus about 4.5 times longer than proximal depth, proximal half of cutting edge with two stout low subacute teeth separated by broad notch; fixed finger similar, proximal third of cutting edge with distal acute, slightly recurved tooth separated by small notch

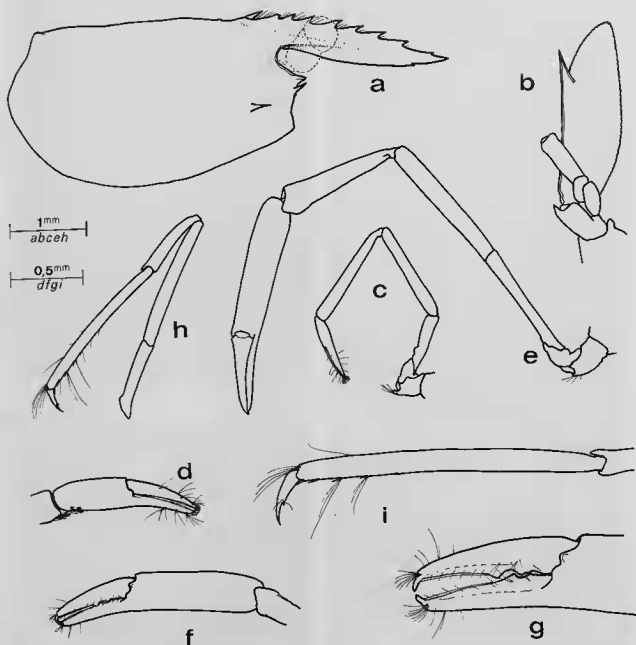


FIG. 20. — *Periclimenes richeri* sp. nov., ovigerous female, holotype, stn DW 72. a, carapace and rostrum. b, antenna, ventral. c, first pereiopod. d, same, chela. e, second pereiopod. f, same, chela. g, same, finger. h, third pereiopod. i, same, propod and dactyl.

from low irregular proximal tooth; carpus about 0.9 of palm length, 4.0 times longer than distal width, distally expanded, unarmed, proximally tapered; merus subequal to palm length, subuniform, 7.5 times longer than central width, unarmed; ischium subequal to carpus, about 0.85 of palm length, 7.8 times longer than distal width; basis and coxa normal. Minor second pereiopod missing.

Ambulatory pereiopods slender, similar to *P. vaubani*; third pereiopod with propod about 0.65 of carapace length; dactyl about 0.18 of propod length; propod about 15.0 times longer than wide, with distoventral spine and four small single spines on distal third of ventral margin, with few long simple setae; merus about 0.85 of propod length.

MEASUREMENTS (mm). — Carapace length, 3.1; carapace and rostrum, 5.2; total body length (approx.), 15.0; chela of major second pereiopod, 2.65; length of ovum, 0.45.

SYSTEMATIC POSITION. — Closely related to *P. vaubani* (vide supra), *P. richeri* may be distinguished by the following features: — (i) rostrum with deeper lamina, lacking raised basal carina dorsally, distinctly exceeding antennular peduncle. (ii) stronger antennal spine, upwardly directed. (iii) scaphocerite with distal lamella strongly produced, far exceeding distolateral tooth. (iv) first pereiopod with fingers subequal to chela, carpus markedly longer than chela. (v) major second pereiopod with fingers about half palm length, dactylus with two proximal teeth on cutting edge, carpus much greater than half palm length, merus of similar length to carpus. (vi) third ambulatory pereiopod with more slender propod, less strongly spinulate, lacking transverse rows of long setae distolaterally.

ETYMOLOGY. — The species is named in honour of Dr Bertrand RICHER DE FORGES, who collected much of the material upon which this present report is based.

REMARKS. — The single example of *P. richeri*, which was collected with *P. vaubani* is fairly complete but unfortunately has only the left second pereiopod and one third ambulatory pereiopod preserved. The cornea may also be significantly smaller in *P. richeri* than in *P.*

coriolis, being about 0.14 of the postorbital carapace length in the former but 0.2 in the latter.

Periclimenes sp.

Fig. 39h

MATERIAL EXAMINED. — New Caledonia. Lagoon survey: stn 420, 22°33' S, 167°9' E, 345 m, Grand Récif Sud, 24 January 1985, coll. RICHER DE FORGES, 1 ovig. ♀ (MNHN-NA 11206).

REMARKS. — The single specimen lacks the left second pereiopod, has a small regenerating right second pereiopod and the rostrum is missing from the base, so that it cannot be satisfactorily identified. However, it belongs to the "*P. grandis* species group" as it has a well developed median process on the fourth thoracic sternite, but it lacks the supraorbital spines found in the original restricted definition of the group provided by KEMP (1922). The species of this group are essentially shallow water forms, generally of free-living, scavenger or micropredator habits. The attached first and ambulatory pereiopods are very slender, the latter with simple dactyls, about 0.17 of the propod length, the third propod subequal to the carapace length, 3.3 mm. The fused part of the of the upper antennular flagellum is particularly long and slender, with about 23 segments, about 1.25 times the carapace length; the short free ramus has 2-3 segments and the longer is long and filiform. The lower flagellum is also unusually long and slender. No species of the "*P. grandis* group" have yet been recorded from depths over 100 m.

PONTONIA Latreille, 1829

Pontonia monnioti sp. nov.

Figs 21-24, 38 e-h, 39 i-j

MATERIAL EXAMINED. — Chesterfield Islands. MUSORSTOM 5: stn CP 275, 24°46.6' S, 159°40.3' E, 285 m, 9 October 1985: 1 ♂, holotype; 1 ♀, allotype (MNHN-NA 11157).

DESCRIPTION. — Small sized shrimps of slender, subcylindrical body form.

Carapace smooth, glabrous; rostrum slender,

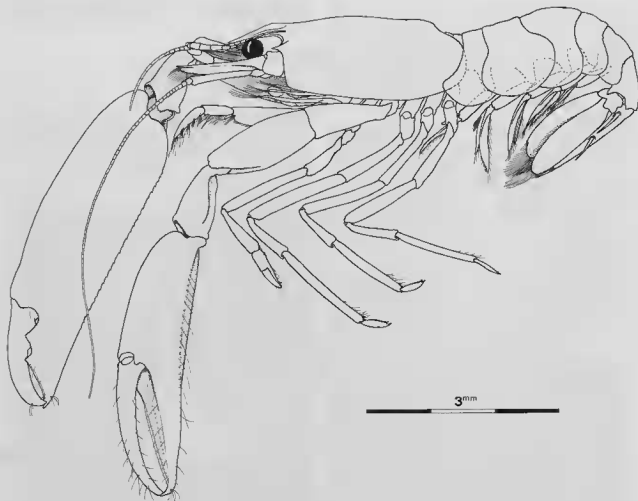


FIG. 21. — *Pontonia monnioti* sp. nov., male, holotype, stn CP 275.

acute in dorsal and lateral views, extending to near distal margin of proximal antennular peduncular segment, narrow in dorsal view, with well marked dorsal carina extending onto anterior carapace, unarmed, without teeth or setae; lateral carina feebly developed distally, broad proximally, non-setose; ventral carina distinct, feebly concave, with small preterminal denticle; supraorbital, epigastric and hepatic spines absent; orbit feebly developed, inferior orbital angle slightly produced, broad, blunt; antennal spine large, acute, marginal, extending far beyond inferior orbital angle; anterolateral angle of carapace slightly produced, broadly rounded, setose.

Abdomen smooth, glabrous; third abdominal

segment not posterodorsally produced; pleura of first three segments broadly rounded, pleura of fourth segment posteriorly produced, broadly rounded, fifth more angularly produced, rounded; fifth segment about 0.7 of length of sixth segment; sixth segment about 1.85 times longer than anterior depth, posteroventral angle expanded, acute, posterolateral angle small, acute. Telson about 2.15 times longer than sixth segment, 2.4 times longer than anterior width, lateral margins convex, posteriorly convergent, posterior margin transverse, without median point, about 0.3 of anterior margin width; with two pairs of large subequal submarginal dorsal spines, about 0.26 of telson length, at 0.28 and 0.5 of telson length, with tips of anterior pair extending to

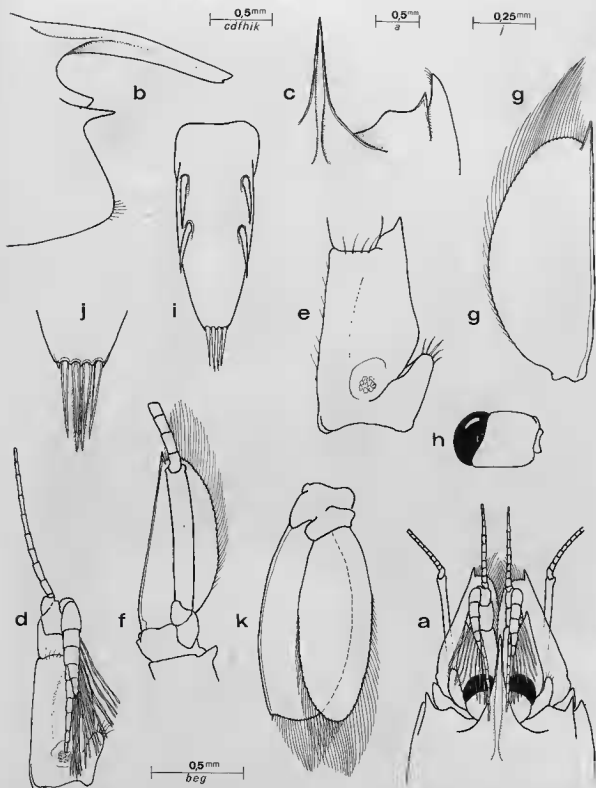


FIG. 22. — *Pontonia monnioti* sp. nov., female, allotype. a, anterior carapace, rostrum, eyes and antennae, dorsal. b, anterior carapace and rostrum, lateral. c, rostrum and right orbital region, dorsal. d, antennule. e, same, proximal segment of peduncle. f, antenna, ventral. g, scaphocerite, dorsal. h, eye, dorsal. i, telson. j, same, posterior spines. k, uropod.

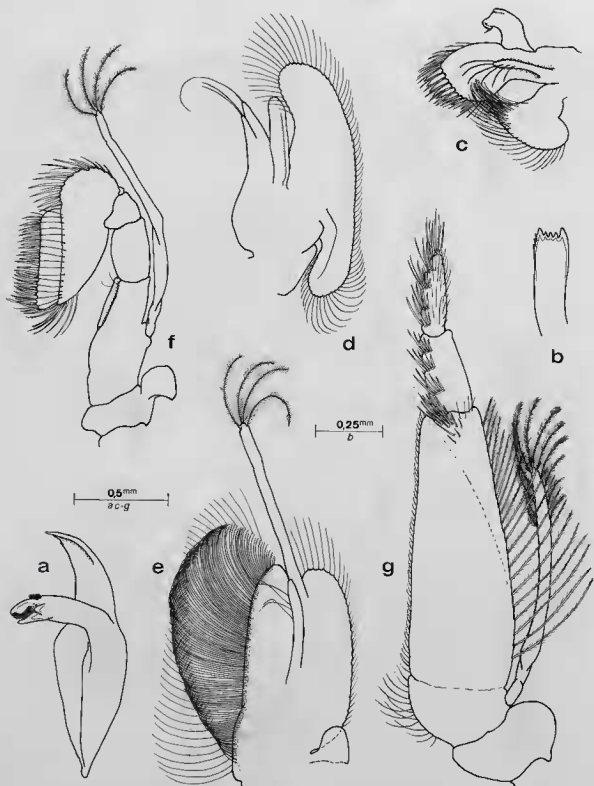


FIG. 23. — *Pontonia monnotti* sp. nov., female, allotype. a, mandible. b, same, incisor process. c, maxillula. d, maxilla. e, first maxilliped. f, second maxilliped. g, third maxilliped.

about level of bases of distal pair; three pairs of posterior spines, lateral spines minute, intermediate spines slender, about 0.80 of dorsal spine length, 0.2 of telson length, submedian spines well developed, about 1.2 times length of intermediate spines, slender, setulose.

Eye with cornea well pigmented, hemispherical, with distinct dorsal accessory pigment spot, diameter subequal to stalk width, slightly oblique; stalk moderately compressed, width subequal to mid-dorsal length.

Antennule with peduncle exceeding rostrum by intermediate and distal segments but not reaching distal margin of scaphocerite; proximal segment about 1.8 times longer than wide; stylocerite short, stout, blunt, distally rounded with plumose setae, statocyst normal, with granular statolith; medial margin straight, sparsely setose, with small acute ventromedial tooth at 0.5 of length; lateral border distally straight, convergent, slightly expanded proximally, distolateral angle strongly produced, with short stout acute distolateral tooth reaching to about 0.75 of intermediate segment length; intermediate segment short, stout, about 0.16 of proximal segment length; 1.8 times broader than long, with feeble medial and lateral lobes, obliquely articulated with distal segment, 1.5 times longer than proximal segment; upper flagellum short, about 0.8 of peduncle length, carried flexed backwards over peduncle, biramous, with proximal three segments stout, fused, shorter free ramus with two segments, about 9 groups of aesthetascs, longer ramus short, slender, six segments; lower flagellum short, slender, subequal to upper flagellum, 9 segments, carried extended anteriorly.

Antenna with basicerite stout, unarmed; carpoperite long, slender, compressed, about 6.0 times longer than broad, reaching almost to anterior margin of scaphocerite, flagellum short, slender, about 3.0 times carapace length; scaphocerite well developed, extending well beyond antennular peduncle, broad, medial margin strongly convex, about 2.3 times longer than wide, maximum width at 0.5 of length, feebly produced distally, lateral margin straight, with large acute distolateral tooth extending far beyond lamella.

Epistome normal, unarmed. Thoracic sternites generally narrow, unarmed, third thoracic sternite broad, fourth without medium process.

Mandible normally robust, without palp; molar process (right), slender, obliquely truncate dis-

tally, with three blunt teeth, lower outer tooth with posterior margin densely fringed with short setae; incisor process well developed, transversely truncate distally, with five acute teeth, inner three smaller than outer teeth, distoventral margin with three small accessory denticles. Maxilla with short stout curved feebly bilobed palp, larger lower lobe with small ventral process with short simple seta; upper lacinia distally broadened, with eight short stout simple spines and numerous, setae, medial surface with low longitudinal setose carina; lower lobe short, stout, tapering distally, with numerous spiniform distal setae and setulose ventral setae. Maxilla with broad simple elongate non-setose palp; basal endite bilobed, lobes tapering distally, upper lobe larger than lower, with single long simple seta, lower lobe with two shorter setae, coxal endite obsolete, medial margin broadly convex; scaphognathite normal, about 3.5 times longer than wide, posterior lobe small, 2.0 times longer than broad, about 0.3 of scaphognathite length, anterior lobe, large, broad, medially curved distally, 2.0 times longer than wide, about 0.4 of scaphognathite length. First maxilliped with long slender simple palp with four distomedial preterminal setae; basal endite elongate, narrow, almost fully fused with coxal endite, combined medial margin with dorsal submarginal row of long densely packed finely setulose dorsally curved setae forming distinct basket, with outer marginal row of longer, stouter less curved and less dense setae; exopod with slender flagellum with four plumose terminal setae, caridean lobe well developed, elongate, narrow; epipod small, simple (? damaged). Second maxilliped with normal endopod, dactylar segment narrow, about 4.4 times longer than broad, medial margin densely spinose, propodal segment with numerous long spiniform setae distomedially, carpus small, with small dorsomedial lobe, basis elongate; exopod with slender flagellum with four plumose distal setae; coxa with small non-setose median projection, without swollen process, epipod small, subquadri-lateral, without podobranch. Third maxilliped with endopod exceeding carpoperite by half length of terminal segment, ischiomerus feebly separated from basis, broadened, strongly compressed, laminar, about 2.6 times longer than wide, greatest width at about 0.25 of length, tapering slightly distally, distal width about 0.6 of proximal width, medial margin densely frin-

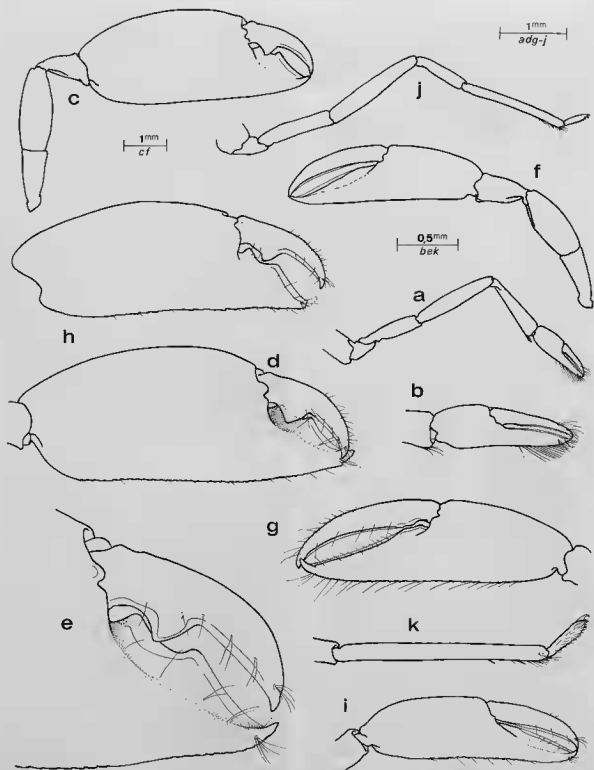


FIG. 24. — *Pontonia monnotti* sp. nov., holotype male and allotype female. a, first pereiopod. b, same, chela. c, major second pereiopod. d, same, chela. e, same, fingers. f, minor second pereiopod. g, same, chela. h, major second pereiopod, chela. i, minor second pereiopod, chela. j, third pereiopod. k, same, propod and dactyl. a, b, h-k, female; c-g male.

ged with short setae, lateral margin sparsely fringed with numerous long plumose setae; penultimate segment about 0.29 of ischiomeral length, 2.0 times longer than proximal width, slightly tapering distally with transverse rows of serrulate spines medially; terminal segment subequal to penultimate segment length, about 3.2 times longer than proximal width, tapering distally with about five transverse rows of serrulate spines medially; basis broad, medial margin convex, setose, lateral margin short, about 0.3 of medial margin length, exopod with slender flagellum with numerous plumose setae distally; coxa obliquely orientated, medial margin convex, nonsetose, with rounded plate laterally, without arthrobranch.

First pereopods slender, exceeding carapocerate by chela and most of carpus; chela with palm compressed, about 1.5 times longer than deep, fingers slender, tapering to small acute feebly hooked tips, cutting edges entire, proximally blunt, feebly gaping, dactylus about 1.25 times palm length, about 5.5 times longer than proximal depth, fixed finger similar, about 3.2 times longer than proximal depth, with longitudinal row of long setae ventrally; carpus subequal to chela length, 4.0 times longer than distal width, tapering proximally, unarmed; merus about 1.25 times carpus length, 5.5 times longer than central width, tapered proximally and distally; ischium subequal to chela length, about 3.8 times longer than central width; basis short, 0.5 of ischial length; coxa without ventromedial process.

Second pereopods well developed, chelae large, unequal, dissimilar, similar in male and female but smaller in latter. Male major chela about 2.12 times carapace length, palm compressed, about 1.9 times longer than deep, greatest depth at about 0.75 of palm length, smooth, ventral margin feebly serrate, sparsely setose; fingers equal about 0.38 of palm length; dactylus, slender, compressed, curved, with acute feebly hooked tip, about 4.0 times longer than proximal depth, distal half of cutting edge entire, sharp, feebly concave, proximal half occupied by single large compressed, acute, feebly recurved triangular tooth; fixed finger deep, about 1.2 times longer than proximal depth, compressed, cutting edge raised laterally with two low subacute teeth proximally, opposing with shearing action against dactylar tooth; carpus about 0.33 of palm

length, narrow proximally, distally expanded, about 1.7 times longer than distal width, unarmed; merus about 0.5 times palm length, moderately compressed, about 2.3 times longer than wide, slightly swollen, greatest width centrally, unarmed; ischium about 0.37 of palm length, 2.2 times longer than distal width, proximally tapered, unarmed; basis and coxa robust, without special features. Male minor chela about 1.7 times carapace length, palm compressed, smooth, ventrally carinate, serrate, sparsely setose, about 1.85 times longer than deep, greatest width distally; fingers about 1.1 times palm length, with large acute feebly hooked tips, cutting edge entire, sharp, concave, over distal three fourths, proximally blunt, without distinct teeth, dactylus feebly curved, slender, compressed, about 5.5 times longer than maximal depth at 0.25 of length, fixed finger deeper proximally, about 2.3 times longer than proximal depth; carpus similar to major pereopod; merus about 0.8 of palm length, 0.9 of second pereopod merus length, 2.2 times longer than central width, unarmed; ischium, basis and coxa as in second pereopod. Female major chela about 1.4 times carapace length, about 0.93 of male major chela length, palm as in male, about 2.70 times maximum depth at about half length, fingers about 0.38 of palm length, essentially as in male; minor chela about 1.0 times carapace length, 0.68 of major chela length, 0.8 of male minor chela length, palm about 2.15 times longer than deep, uniform; fingers about 0.6 of palm length, essentially as in male; carpus, merus, ischium, basis and coxa also as in male but slightly shorter and less robust.

Ambulatory pereopods slender. Third pereopod exceeds carapocerate by dactyl, propod and half carpus; dactyl compressed, about 0.25 of propod length, unguis distinct, large, acute, strongly hooked, obliquely attached, about 0.28 of corpus length, corpus about 3.6 times longer than wide, distally broadened, maximum depth at about 0.75 of length with large distoventral acute hooked accessory tooth, ventral margin convex with about 13 less acute hooked accessory teeth, of diminishing size proximally, along distal two thirds of ventral margin, ventral and lateral aspects of corpus with numerous setae; propod about 0.82 of carapace length, about 2.0 times longer than wide, uniform, slightly compressed, with small distoventral and three

short simple distal ventral spines and setae; carpus about 0.5 of propod length, 4.5 times longer than distal width, feebly tapered proximally, unarmed; merus subequal to propod length, about 6.0 times longer than central width, unarmed; ischium about 0.7 of merus length, 5.0 times longer than distal width, unarmed; basis and coxa without special features. Fourth and fifth pereopods similar; fourth propod about 0.8 times length of third, fifth propod subequal to fourth.

Male first pleopod with basipodite about 2.5 times longer than broad; exopod about 1.15 times longer than basipodite, 4.5 times longer than proximal width; endopod about 0.6 of basipodite length, 4.0 times longer than proximal width, proximal half tapering strongly, with slender distal half, proximal 0.65 of medial margin with eight short spiniform setae, of decreasing length distally, proximal setae feebly setulose, distal setae non-setulose, lateral margin without setae. Second pleopod with basipodite length subequal to first, about 1.0 times longer than width; exopod about 1.6 times basipodite length, 4.5 times longer than wide; endopod about 1.35 times basipodite length; appendix masculina with corpus about 7.0 times longer than wide, reaching to 0.5 of endopod length, with two long, one shorter simple distal spines, longest spine about 0.8 of corpus length, with two long distal ventromedial spines; appendix interna slender, reaching to about 0.66 of endopod length, 1.6 times appendix masculina length, with about 8-10 distal concinnuli.

Uropods distinctly exceeding telson; protopodite with posterolateral angle rounded; endopod broad, about 2.2 times longer than maximum width, situated at about half length, lateral margin convex, without distolateral tooth, with small mobile spine only, distal lamella reduced, scarcely exceeding distolateral spine, no visible diaeresis; endopod subequal to exopod length, about 2.6 times longer than wide.

MEASUREMENTS (mm). — Holotype male: carapace length, 2.45; carapace and rostrum, 3.2; total body length (approx.), 8.75; chela of major second pereopod, 5.2; chela of minor second pereopod, 4.2. Allotype female: carapace and rostrum, 3.1; total body length (approx.), 8.0; chela of major second pereopod, 4.3; chela of minor second pereopod, 3.1.

HOST. — *Ascidia* sp. nov. [Tunicata: Ascidiidae]. To be described by C. MONNIOT and F. MONNIOT.

SYSTEMATIC POSITION. — Closely related to several species of *Pontonia* characterised by the presence of a series of hook-like accessory teeth along the ventral margin of the ambulatory dactyls, i.e., *P. ascidicola* Borradaile, *P. okai* Kemp, *P. anachoreta* Kemp and, to a lesser extent, *P. stylirostris* Holthuis, although the latter is immediately distinguished from all other species by the presence of acute dorsal rostral teeth. Of these, *P. monnotti* most closely resembles *P. ascidicola*, a species which also occurs in relatively deep water. *P. monnotti* may be distinguished from *P. ascidicola* by the following features: (i) long slender rostrum, distally compressed, with small preterminal ventral tooth, far exceeding anterior margin of cornea, reaching almost to proximal end of intermediate antennular peduncular segment, with distinct dorsal carina, extending onto the anterior carapace, (ii) anterior pair of dorsal telson spines arising at 0.28 of telson length and overlapping posterior pair, (iii) stylocerite short and distally rounded, with short plumose setae, (iv) scaphocerite tapering distally, with distolateral tooth straight and projecting well beyond anterior margin of lamina, (v) maxillula with upper lacinia with setose dorsal carina, lower lacinia not markedly expanded, (vi) antepenultimate segment of third maxilliped endopod about 3.3 times longer than maximal width, 2.0 times longer than combined penultimate and terminal segment lengths, (vii) fingers of first pereopod distinctly longer than palm of chela, and (viii) the presence of several spines along the ventral margin of the ambulatory propods.

ETYMOLOGY. — The species is named in honour of Dr Claude MONNIOT, who was responsible for the discovery of this species.

REMARKS. — *P. monnotti* is a typical representative of the genus *Pontonia* Latreille, but the carina along the inner surface of the upper lacinia of the maxillula of *P. monnotti* is unusual and similar features have not been reported in other *Pontonia* species or other palaemonid shrimps, but could easily have been overlooked. No distinct carina can be detected in *P. pinno-*

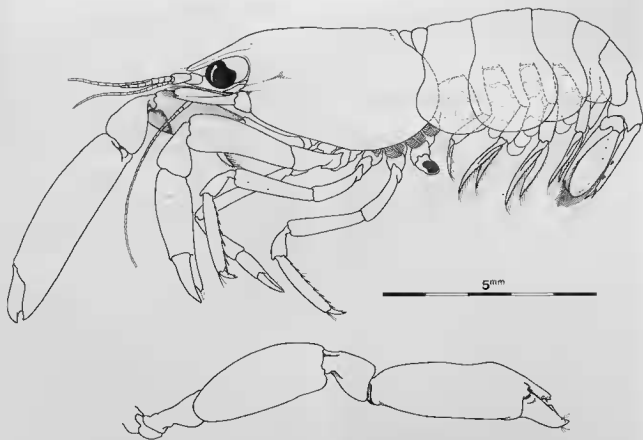


FIG. 25. — *Altopontonia disparostris* gen. nov., sp. nov., ovigerous female, holotype, stn DW 22. Lower figure: major second pereiopod, lateral aspect.

phylax (Otto), the type species of the genus *Pontonia*, but a short longitudinal row of simple setae is present in this situation (♀, MNHN-NA 1965).

ALTOPONTONIA gen. nov.

DEFINITION. — Small sized shrimps of subcylindrical body form. Rostrum well developed, slender, distinctly dentate in males, feebly dentate in females, lateral carinae feebly expanded posteriorly. Carapace smooth, epigastric, supraorbital and hepatic spines absent, orbit feebly developed, inferior orbital angle distinct, with stout antennal spine, anterolateral branchiostegite bluntly angular. Fourth thoracic sternite without median process. Abdomen smooth, pleura all broadly rounded. Telson with two pairs of

dorsal spines, three pairs of posterior spines. Antennae normal, scaphocerite well developed. Mandible, without palp. Maxilla with bilobed endite, scaphognathite narrow. First maxilliped with basal and coxal endites distinct, exopod with slender flagellum, epipod triangular, bilobed. Second maxilliped with normal endopod, slender exopod, coxa with conspicuous median boss, epipod trapezoidal, without podobranch. Third maxilliped with slender endopod, exopod slender, coxa with oval lateral plate, arthrobranch rudimentary. First pereiopods slender, chela with fingers feebly subspatulate. Second pereiopods well developed, chelae robust, unequal, dissimilar, major chela with palm distally swollen, fingers stout, short, dentate, without molar process and fossa; minor chela with fingers longer, feebly armed; carpus distoventrally excavate with strong lateral flange, unarmed. Ambulatory pereiopods robust, dactyls

biunguiculate, without basal protuberance; merus, distoventrally excavate, with strong distolateral flange, distomedial on fifth. Uropods normal, exopod with small distolateral tooth, with mobile spine medially.

TYPE SPECIES. — *Altopontonia disparostris* sp. nov.

SYSTEMATIC POSITION. — The most closely related genus to *Altopontonia* is *Diapontonia* Bruce, 1986, an associate of Atlantic deep-sea echinoids. *Altopontonia* differs from *Diapontonia* principally in the form of the major chela, with its characteristic fingers and distally distended palm, with the stout ventrally excavate merus with the conspicuously developed lateral flange. The dactyls of the ambulatory pereiopods are simply biunguiculate and lack the detailed ornamentation found in *Diapontonia*, and also show the strong development of distal meral flanges, not found in *Diapontonia*. The coxa of the second maxilliped shows a characteristic medial protuberance that is absent from *Diapontonia* and unique to *Altopontonia*. Of the Indo-West Pacific genera, *Altopontonia* shows some resemblance to *Plesiopontonia* Bruce, 1985, a deep-sea genus of unknown associations, but for which bivalve molluscs have been suggested as hosts. *Plesiopontonia* has slender pereiopods, with comparatively feebly developed chelae, and the meri are without lateral flanges.

ETYMOLOGY. — *Altus*, deep sea (Latin); *Pontonia*, generic name first used by LATREILLE, 1829.

REMARKS. — The resemblance to *Diapontonia* suggests that *Altopontonia* may also be an associate of echinoid hosts. The stout form of the second pereiopods is also reminiscent of that of several species of *Athanas*, *A. indicus* (Coutière), *A. dorsalis* (Stimpson), *A. acanthocarpus* Miya & Miyake, and others, that are associated with shallow-water echinoid hosts. These generally carry the chelae extended when moving on the host or feeding from the substrate below the host. When disturbed they are capable of swimming rapidly to make their escape, during which the chelae are flexed, with the carpus fitting precisely into the distoventral meral excavation.

Altopontonia disparostris sp. nov.

Figs 25-33, 39 k

MATERIAL EXAMINED. — New Caledonia. BIOCAL: stn DW 44, 22°47' S, 167°14' E, 440-450 m, 30 August 1985: 1 ♂ (MNHN-NA 12572). — Stn CP 45, 22°47' S, 167°15' E, 430-465 m, 30 August 1985: 5 ♀ (4 ovig.), (1 ovig. ♂, 1 ♀, MNHN-NA 12573; 1 ovig. ♀, NTM Cr.006784; 1 ovig. ♀, USNM 243225).

MUSORSTOM 4: stn 222, 22°57.6' S, 167°33.0' E, 410-440 m, 30 September 1985: 2 ovig. ♀, paratypes (MNHN-NA 11147).

SMIB 3: stn DW 22, 23°03' S, 167°19' E, 503 m, 24 May 1987: 1 ovig. ♀, holotype (MNHN-NA 11148).

DESCRIPTION. — Small sized, stoutly built shrimps of robust subcylindrical body form.

Carapace smooth, glabrous; rostrum well developed, reaching to end of intermediate segment of antennular peduncle, distally acute, slightly depressed, stout, shallow in lateral view. In adult females, dorsally broad, convex, without dorsal carina or teeth, with small pre-terminal notch, with pair of simple setae, juvenile females with four or five minute dorsal teeth; male rostrum acute, with eight small teeth distributed over whole length of feeble dorsal carina, acute, first tooth posterior to orbital margin, blunt, with preterminal dorsal notch with paired simple setae; lateral carina feebly developed, sparsely setose; ventral carina proximally obsolete, distally distinct with small acute preterminal tooth proximal to level of dorsal subterminal setae, non-setose. Supraorbital, epigastric and hepatic spines absent, orbit feebly developed, inferior orbital angle feebly produced, broad, blunt; antennal spine robust, acute, marginal, extending well beyond inferior orbital angle; anterolateral angle of carapace bluntly rectangular.

Abdomen stout, smooth, glabrous; third segment not posterodorsally produced, fifth segment about 0.7 of sixth segment length, sixth segment about 1.9 times longer than anterior depth, depressed, posterolateral angles acute, posteroventral angles expanded, broad, acute; pleura of first three segments broadly rounded, fourth and fifth posteriorly produced, rounded. Telson about 1.6 times length of sixth sixth abdominal segment, 2.0 times longer than ante-

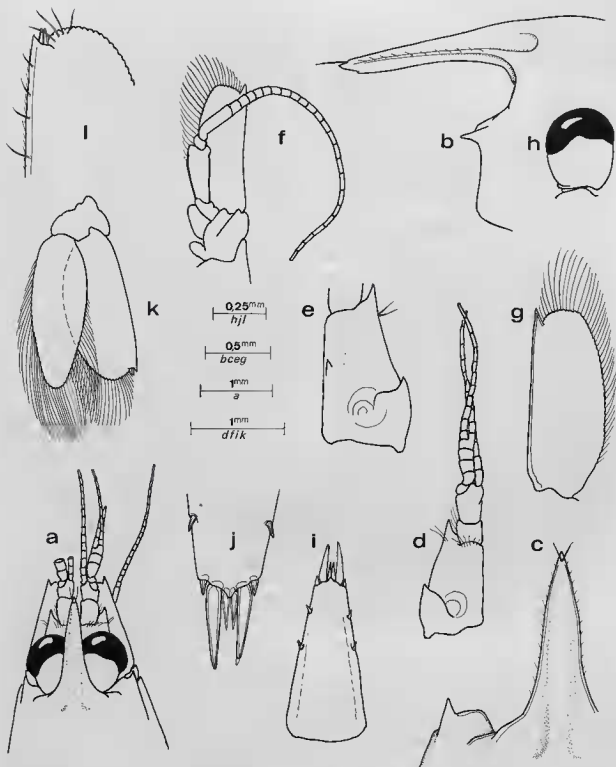


FIG. 26. — *Altopontonia disparostris* gen. nov., sp. nov., paratype female, stn 222. a, anterior carapace, rostrum, eyes and antennae, dorsal. b, anterior carapace and rostrum, lateral. c, rostrum and left orbital region, dorsal. d, antennule. e, same, proximal poduncular segment. f, antenna, ventral. g, scaphocerite, dorsal. h, eye. i, telson. j, same, posterior spines. k, uropod. l, same, exopod, distolateral tooth and spine.

rior width, lateral margins straight, convergent, posterior margin about 0.4 of anterior width, angular, with broad median point; two pairs of small marginal dorsal spines at 0.57 and 0.78 of telson length; three pairs of posterior spines, lateral spines robust, similar to dorsal spines, intermediate spines long, stout, about 0.33 of telson length, submedian spines robust, about 0.5 of length of intermediate spine, non-setulose.

Eye with large well pigmented hemispherical cornea, without distinct accessory pigment spot, diameter subequal to stalk length, transverse; stalk moderately compressed, about 1.25 times broader than long dorsally.

Antennule with peduncle distinctly exceeding rostrum, extending to about distal margin of lamella of scaphocerite, proximal segment about 1.76 times longer than proximal width, stylocerite short, broad, acute, reaching to about 0.5 of medial margin length, statocyst normal with oval statolith, medial margin with stout acute tooth at 0.5 of length, lateral margin feebly concave, distally convergent, distolateral angle strongly produced with large stout acute distolateral tooth reaching to level of distal margin of intermediate peduncular segment; intermediate segment short, stout, about 0.22 of medial length of proximal segment about 1.5 times broader than dorsal length, lateral lobe feeble; distal segment 2.0 times length of intermediate segment, 2.0 times longer than wide; upper flagellum biramous with four proximal segments stout, fused; shorter free ramus with four segments, longer free ramus with eleven segments, slender; about five groups of aesthetascs present; lower flagellum short, slender, about 14 segments.

Antenna with basicerite stout, laterally unarmed; carapocerite robust, about 2.6 times longer than distal width, extending to about 0.5 of lateral length of scaphocerite, flagellum short, subequal to carapace length; scaphocerite well developed, reaching to level of end of antennular peduncle, broad, about 2.4 times longer than maximal width, situated at about 0.4 of length, distally broad, feebly produced, broadly rounded, lateral margin straight with stout distolateral tooth, subequal to distal margin of lamella.

Epistome normal, unarmed. Thoracic sternites narrow, unarmed; fourth broad without slender median process, with low central transverse ridge, transverse lateral ridges posteriorly.

Mandible normally robust, without palp; molar process (left) stout, with five large blunt teeth, no obvious setae; incisor process well developed with three acute teeth on oblique distal margin, largest tooth laterally, smallest centrally. Maxillula with deeply bilobed palp, lower lobe stouter with small ventral process bearing single short curved simple spine; upper lacinia slightly broadened, distal margin transverse with double row of about 14 stout simple spines, with serrulate spiniform setae along dorsal and ventral margins; lower lacinia short, tapering, with numerous finely serrulate setae, becoming spiniform distally. Maxilla with simple palp, proximal half expanded, with short plumose setae laterally, distal half slender, tapering, blunt, non-setose; basal endite well developed, deeply bilobed, upper lobe slightly more robust than lower, with about 30 and 20 finely serrulate distal setae respectively; coxal endite obsolete, medial margin convex; scaphognathite narrow, about 4.5 times longer than central width, posterior lobe normal, short, about 0.25 of scaphocerite, 1.45 times longer than wide, anterior lobe about 0.45 of scaphognathite length, 2.0 times longer than proximal width, tapering distally, with distal half particularly narrow. First maxilliped with long, slender, tapering palp with preterminal setulose setae; basal endite well developed, broad, round, distal and medial margins densely setose, coxal endite, distinct, feebly bilobed, distal lobe sparsely setose; exopod with slender flagellum with four plumose distal setae, caridean lobe well developed, narrow; epipod large, triangular, bilobed. Second maxilliped with endopod normal, dactylar segment about 3.2 times longer than broad, densely spinose medially, propodal segment with numerous long spiniform setae distomedially, carpus with large medial angle; exopod with slender flagellum with four plumose distal setae; coxa medially produced with swollen setose globular process; epipod well developed, trapezoidal, without podobranch. Third maxilliped with endopod distinctly exceeding distal end of carapocerite; ischiomerus distinct from basis, about 4.75 times longer than wide, uniform, compressed, medial border with sparse simple spiniform setae, lateral margin sparsely setose; penultimate segment about 0.75 of ischiomer length, 6.2 times longer than central width, uniform, medial margin moderately setose, terminal segment about 0.45 of ischiomer length,

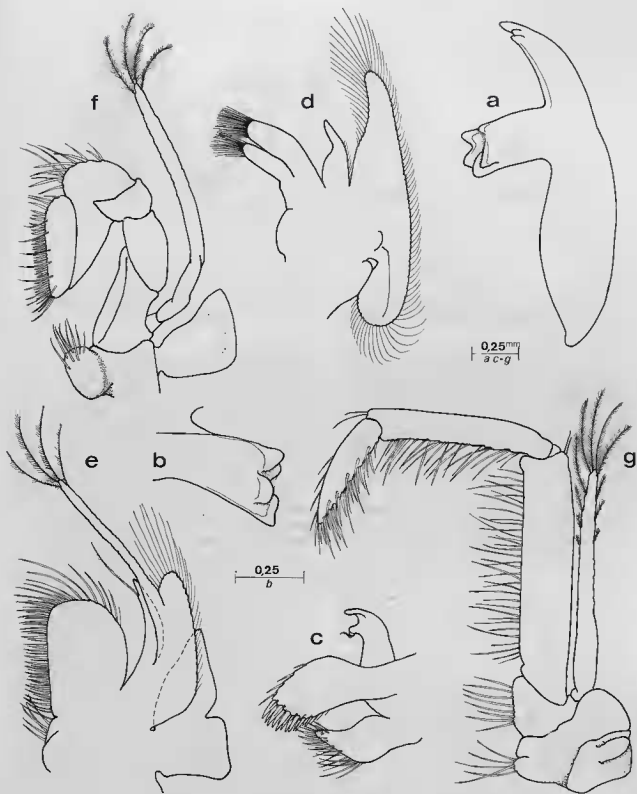


FIG. 27. — *Altopontonia disparostris* gen. nov., sp. nov., paratype female, stn 222. a, mandible. b, same, molar process. c, maxillula. d, maxilla. e, first maxilliped. f, second maxilliped. g, third maxilliped.

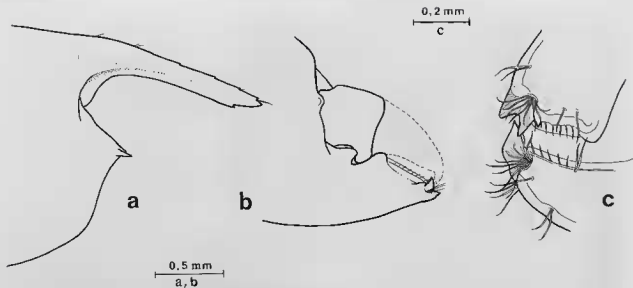


FIG. 28. — *Altopontonia disparostris* gen. nov., sp. nov., females, stn CP 45. a, anterior carapace and rostrum, CL 2.6 mm. b, fingers of major chela, CL 2.9 mm. c, same, tips of fingers, CL 3.2 mm.

tapering distally, about 4.0 times longer than proximal width, with short simple distal spine, medial margin with several transverse groups of short serrulate spines; ischiomeral articulation with basis oblique, basis with medial margin straight, setose, about 0.25 of ischiomeral length; exopod with well developed flagellum with five long plumose distal and several shorter preterminal setae; coxa with medial border feebly bilobed, proximal lobe setose, distal lobe glabrous, with large oval plate laterally; arthrobranch rudimentary, without lamellae.

First pereiopods normal, exceeding scaphocerite by chela and distal third of carpus; chela with palm about 1.5 times longer than deep, compressed, smooth, with few cleaning setae proximally; fingers slender, simple, dactylus about 1.1 times palm length, 3.8 times longer than proximal depth, with acute curved tip, entire lateral cutting edge; fixed finger similar, both with numerous groups of the setae; carpus subequal to chela length, about 3.7 times longer than distal width, tapering proximally; merus about 1.1 times carpus length, slightly bowed, uniform, about 5.4 times longer than central width; ischium about 0.57 of merus length, robust, 2.5 times longer than central width; basis short, about 0.5 of ischial length; coxa with small ventromedial process, with small group of setae only.

Second pereiopods well developed, chelae large, unequal, dissimilar. In female, major second pereiopod extends beyond antennular peduncle and scaphocerite by chela, carpus and distal fourth of merus; chela smooth, glabrous, equal to about 1.45 of carapace length, moderately compressed, without carinate ventral margin, distally expanded, 2.0 times longer than distal width, proximal width about 0.5 of distal width; dactylus about 0.38 of palm length, robust, compressed, 2.0 times longer than proximal depth, with small acute hooked tip, with 1-2 small accessory teeth on distal outer margin, cutting edge blunt, strongly concave, with single large irregular tooth occupying central third, large circular fossa present on proximo-medial aspect; fixed finger short, stout, about as long as proximal depth, with feeble, subacute hooked tip, with single slightly smaller accessory tooth on distal outer margin, cutting edge blunt, central half occupied by single large, irregular subacute tooth, proximal lateral aspect of fixed finger with blunt process; fingers oppose with shearing action, dactylar teeth closing medially to fixed finger tooth; carpus short, stout, distally expanded, unarmed, about 1.4 times longer than distal width, about 0.35 of palm length; merus stout, about 0.95 of palm length, swollen, 2.5 times longer than maximal width, at about 0.6 of length, distoventral angle produced, laminar,

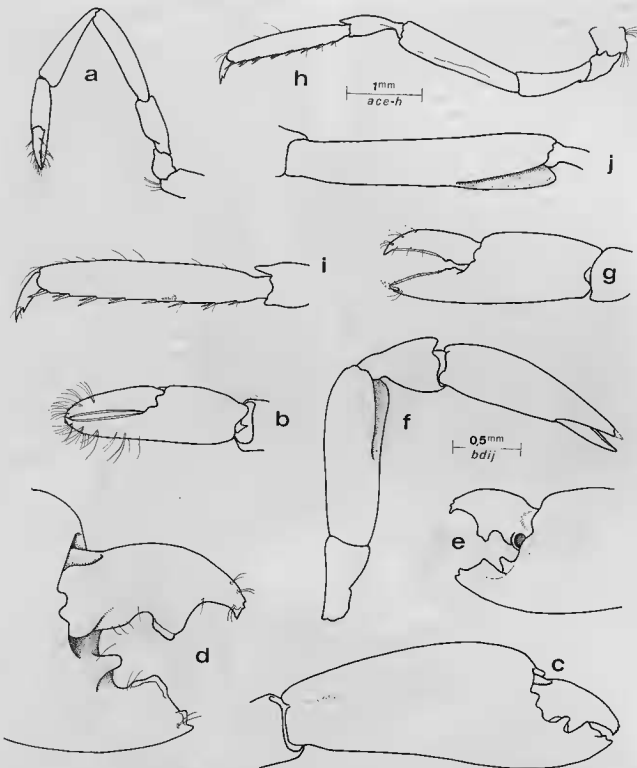


FIG. 29. — *Altopontonia disparostris* gen. nov., sp. nov., ovigerous female holotype, stn DW 22, and paratype, stn 222. a, first pereiopod. b, same, chela. c, major second pereiopod, chela. d, same, fingers, lateral. e, same, medial. f, minor second pereiopod. g, same, chela. h, third pereiopod. i, same, propod and dactyl. j, same, merus, medial aspect. a, b, h-j, paratype female. c-g, holotype female.

rounded; ischium about 0.45 of palm length, about 2.0 times longer than distal width, tapered proximally, unarmed; basis and coxa robust, without special features. Minor second pereopod exceeds carapocerite by chela and carpus; chela about 0.95 of carapace length, smooth, glabrous, subcylindrical, moderately compressed, about 1.8 times longer than deep, slightly tapered proximally; fingers simple with acute, feebly hooked tips, dactyl about 0.75 of palm length, 3.5 times longer than proximal width, cutting edge slightly laterally situated, sharp, entire, with single small acute tooth at 0.3 of length, fixed finger similar, with two small teeth on proximal third; carpus about 0.66 of palm length, robust, distally expanded, unarmed, about 1.4 times longer than wide; merus about 0.9 of chela length, 2.8 times longer than distal width, distoventrally excavate with well marked distolateral flange, distoventral angle rounded; ischium about 0.45 of meral length, 1.8 times longer than distal width, proximally tapered, unarmed; basis and coxa without special features. In male, generally similar to female; major chela about 1.27 of carapace length, palm 2.5 times longer than wide, greatest width at 0.6 of length; minor chela about 0.7 of major chela length, 0.91 of carapace length, palm 2.0 times longer than wide, greatest width at 0.5 of palm length; proximal segments similar to female.

Ambulatory pereopods robust. Third pereopod exceeds antennular peduncle by dactyl and three fourths of propod; dactyl compressed, about 0.25 of propod length, unguis distinct, simple, curved, about 0.45 of corpus length, corpus about 2.5 times longer than proximal depth, with two distolateral and one distomedial sensory setae, ventral cutting edge sharp, entire, with strong acute distoventral accessory tooth; propod about 0.55 of carapace length, 6.0 times longer than deep, uniform, slightly compressed, with pair of distoventral spines, border strongly spinose throughout length, spines large, generally paired, slightly irregular, dorsal margin sparsely setose; carpus about 0.42 of propod length, centrally swollen, proximally slender, unarmed, about 2.6 times longer than central width; merus equal to propod length, about 4.5 times longer than distal width, distally swollen, distoventrally excavate, distolateral border with flange, distoventral angle rounded; smaller flange medially; ischium about 0.6 of propod length, 2.9 times longer than distal width, proximally tapered, unarmed; basis and coxa without special features. Fourth and fifth pereopods similar to third. Fourth, with propod slightly shorter than third, less heavily spinose, fifth equal to fourth, without transverse rows of cleaning setae distally.

Male first pleopod with basipodite about

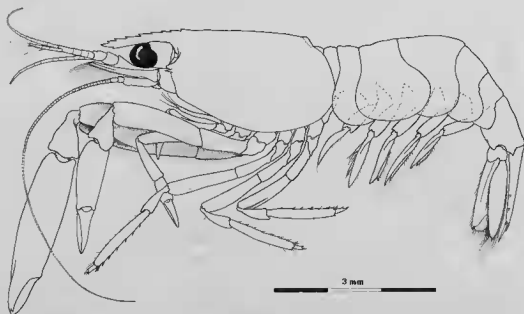


FIG. 30. — *Altopontonia disparostris* gen. nov., sp. nov., male, stn DW 44.

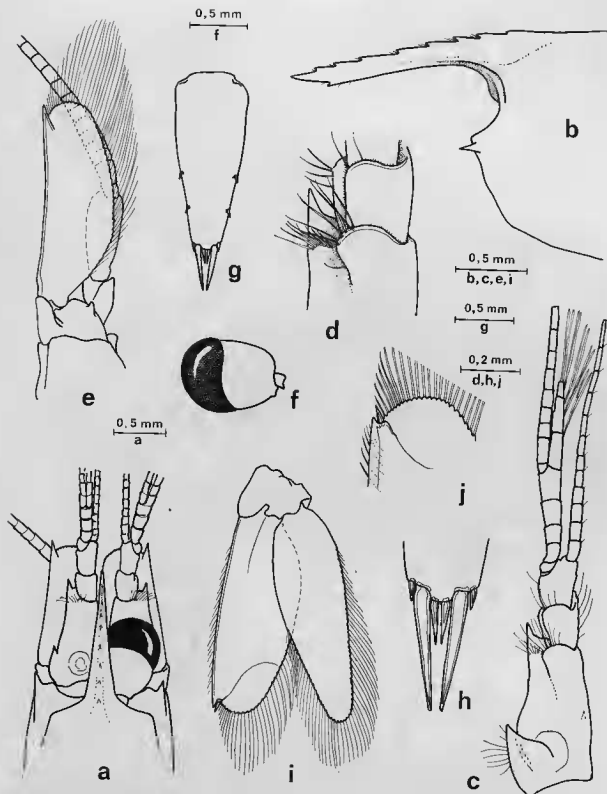


FIG. 31. — *Altopontonia disparastris* gen. nov., sp. nov., male, stn DW 44. a, anterior carapace, rostrum, eye and antennae, dorsal. b, anterior carapace and rostrum, lateral. c, antennule, lateral. d, same, distal proximal segment and intermediate segment of peduncle. e, antenna. f, eye. g, telson. h, same, posterior spines. i, uropod. j, same, distolateral exopod.

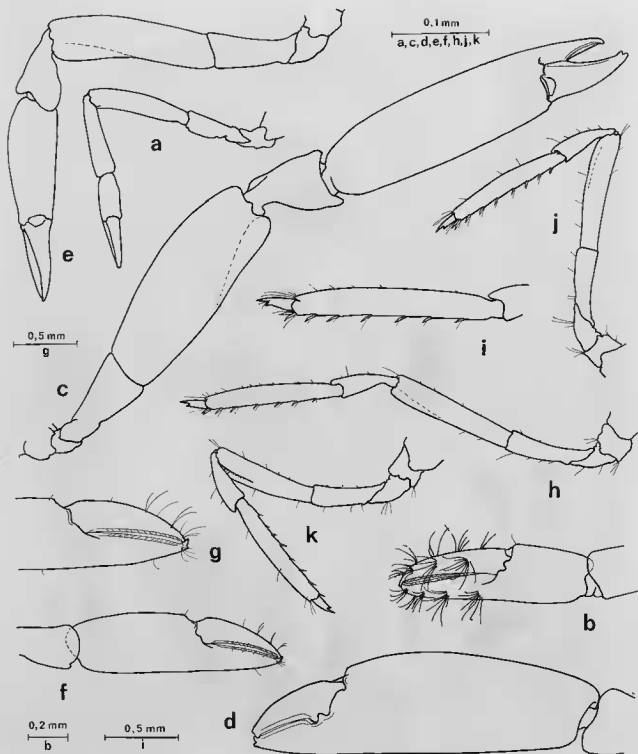


FIG. 32. — *Altopontonia disparostris* gen. nov., sp. nov., male, stn DW 44. a, first pereiopod. b, same, chela. c, major second pereiopod. d, same, chela. e, minor second pereiopod. f, same, chela. g, same, fingers. h, third pereiopod. i, same, propod and dactyl. j, fourth pereiopod. k, fifth pereiopod.

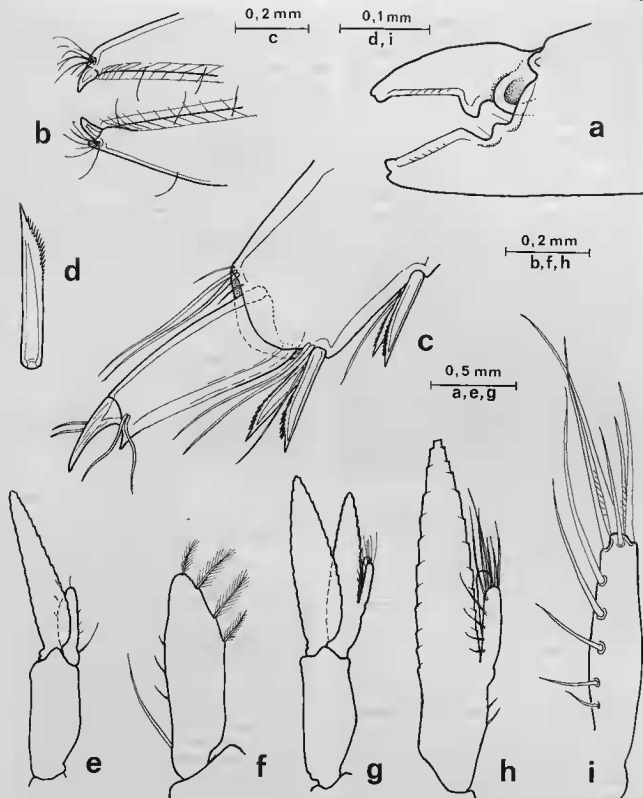


FIG. 33. — *Altopontonia disparostris* gen. nov., sp. nov., male, stn DW 44. a, major second pereiopod, fingers. b, minor second pereiopod, finger tips. c, third pereiopod, distal propod and dactyl. d, same, distal propodal spine. e, first pleopod. f, same, endopod. g, second pleopod. h, same, endopod. i, same, appendix masculina.

2.5 times longer than broad; endopod about 0.6 of basipodite length, 3.7 times longer than wide, distal third tapered, blunt, distolateral margin with four short plumose setae, medial margin with single long simple spiniform seta proximally, three short spiniform setae centrally; exopod about 2.2 times longer than endopod, 4.5 times longer than wide. Male second pleopod with basipodite about 2.7 times longer than wide, 1.1 times longer than first basipodite; endopod about 1.15 times longer than basipodite, 4.7 times longer than wide, with appendices at 0.33 of medial border; appendix masculina reaching to about 0.6 of endopod length, corpus subcylindrical, slightly swollen centrally, about 4.0 times longer than central width, with five distal spines, two finely setulose proximolaterally, ventrolateral surface with five spiniform setae, short proximally, long distally; appendix interna slightly exceeding appendix masculina, with few distal concinnuli.

Uropod distinctly exceeding telson, protopodite with distolateral lobe bluntly rounded; exopod about 2.3 times longer than broad, greatest width at 0.5 of length, lateral margin feebly convex, with acute distolateral tooth, with small mobile spine medially (two in dissected specimen); endopod subequal to exopod length, about 2.75 times longer than wide.

Ova relatively few, small.

MEASUREMENTS (mm). — Holotype female: carapace length, 3.3; rostrum and carapace, 5.0; total body length (approx.), 13.0; second pereopod, major chela, 4.8; same, minor chela, 3.3; length of ovum, 0.5. Paratype females: carapace lengths, 3.0-3.6. Male: carapace length, 2.4; rostrum and carapace, 3.8; total body length (approx.), 10.0; second pereopod, major chela, 3.05; same, minor chela, 2.2.

ETYMOLOGY. — *Dispar*, unlike (Latin); *rostrum*, beak (Latin); with reference to the dissimilar rostra of the male and female specimens.

REMARKS. — The present specimens of *Altopontonia disparostris* are remarkable, amongst pontonine shrimps, for the degree of sexual dimorphism in the rostra and second pereopods. The male rostrum is distinctly dentate in the single specimen available and without teeth along the dorsal margin in the larger females, but

a series of minute teeth are present in the smaller female specimens. Similarly, the characteristic form of the major chela, with the distally swollen palm and reduced fingers is shown most conspicuously in the larger females rather than, as is usually the case, in the males.

Unfortunately, the single male specimen was not captured in association with any of the female specimens so that it remains a possibility that it could represent a related species of the same genus. It is therefore not allocated the status of allotype or paratype.

Specimens of *Altopontonia disparostris* have been deposited in the collections of the Rijksmuseum van Natuurlijke Historie, Leiden; the U.S. National Museum, Washington and the Northern Territory Museum, Darwin.

MESOPONTONIA Bruce, 1967

Mesopontonia gracilicarpus sp. nov.

Figs 34-37, 39 I-m

MATERIAL EXAMINED. — New Caledonia. SMIB 2: stn DW 5, 22°56' S, 167°14' E, 398-410 m, 17 September 1986: 1 ovig. ♀, holotype (MNHN-NA 11140).

DESCRIPTION. — A small sized slenderly built shrimp of subcylindrical body form.

Carapace smooth, glabrous; rostrum equal to about 1.35 of carapace length, extending almost to end of antennular peduncle, straight, distally acute; dorsal carina well developed, highest at level of fourth tooth with eight large acute teeth, evenly spaced along length, posterior two situated on carapace posterior to orbital margin; lateral carina distinct, narrow; ventral carina distinct, feebly convex with two large acute teeth distal to sixth dorsal tooth; dorsal interdermal spaces setose, ventral carina setose proximal to teeth; supraorbital spines absent, epigastric spine present, orbit feebly developed, inferior orbital angle produced, narrow, blunt, with small reflected inner flange; antennal spine absent; hepatic spine large, slender, well below level of inferior orbital angle, below first dorsal rostral tooth; anterolateral angle of carapace obtuse, blunt.

Abdominal segments smooth, glabrous; third segment not posterodorsally produced, fifth seg-

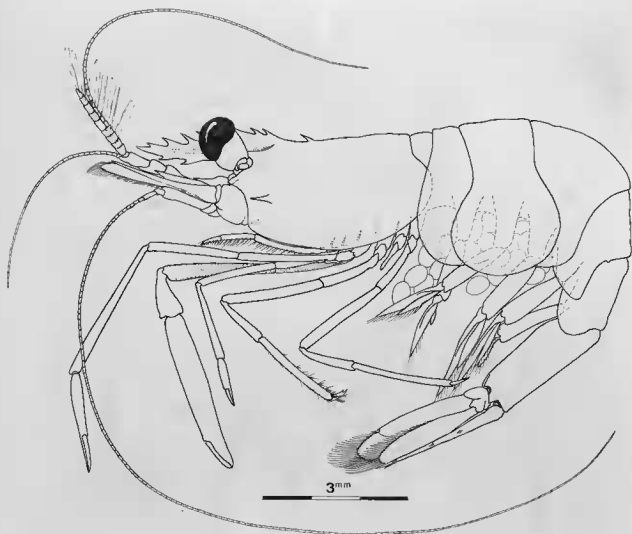


FIG. 34. — *Mesopontonia gracilicarpus* sp. nov., ovigerous female, holotype, sta DW 5.

ment about 1.7 of sixth segment length, sixth segment about 2.4 times longer than anterior depth, posterolateral angle acute, posteroventral angle subacute; pleura of first three segments enlarged, broadly rounded, fourth angularly produced, posteroventrally rounded, fifth feebly produced. Telson broken, about subequal to sixth abdominal segment length, about 4.0 times longer than anterior width, lateral margins straight, posterior margin about 0.5 of anterior margin width, slightly produced centrally, without median point; two pairs of small submarginal dorsal spines at about 0.4 and 0.7 of telson length; posterior margin with three pairs of spines,

lateral spines small, subequal to dorsal spines, intermediate spines long and slender, about 0.25 of telson length, submedian spines about 0.5 of intermediate spine length, setulose.

Eye with large well pigmented globular cornea, with small distinct accessory pigment spot, oblique, diameter exceeding stalk length; stalk slightly compressed, about 1.2 times longer than maximum width.

Antennular peduncle distinctly exceeding rostrum; proximal segment about 2.0 times longer than central width, with slender acute stylocerite reaching to about 0.4 of medial length, anterolateral margin distinctly produced, with small

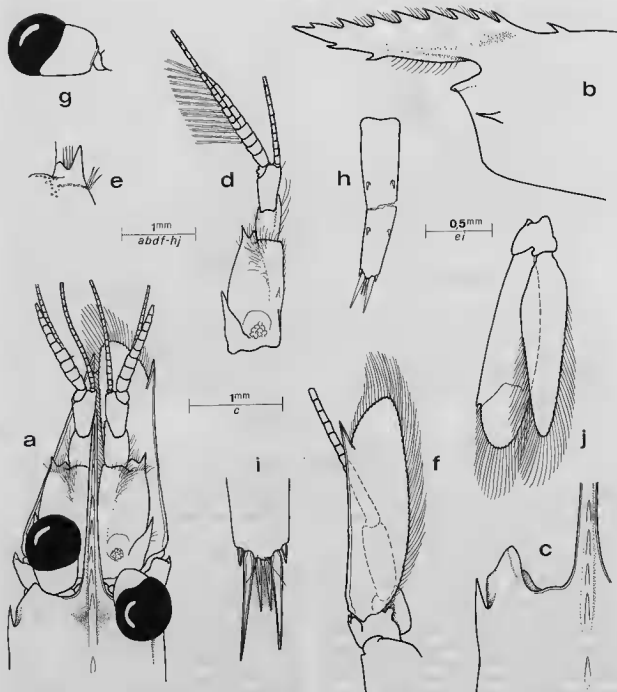


FIG. 35. — *Mesopontonia gracilicarpus* sp. nov., ovigerous female, holotype. a, anterior carapace, rostrum, eyes and antennae, dorsal. b, anterior carapace and rostrum, lateral. c, left orbital region, dorsal. d, antennule. e, same, proximal peduncular segment, distolateral angle. f, antenna, dorsal. g, eye, dorsal. h, telson. i, same, posterior spines. j, uropod.

medial lobe and strong lateral tooth reaching to about 0.3 of intermediate peduncular segment length, ventromedial margin with strong acute tooth at about 0.5 of length; statocyst normally developed with granular statolith; intermediate and distal segments narrow, obliquely articulated, together equal to about 0.65 of proximal segment length, intermediate segment with lateral lobe, feebly developed, about 0.9 times wider than dorsal length, distal segment about 1.9 times longer than wide; upper flagellum biramous with four proximal segments fused, robust, shorter free ramus robust, with six segments, longer free ramus slender, about 2.5 times postorbital carapace length; about 17 groups of aesthetascs present; lower flagellum slender, about 1.25 times carapace length.

Antennal basicerite with small subacute lateral tooth; carpocerite about 2.5 times longer than wide, reaching almost to middle of lateral margin of scaphocerite, flagellum well developed, filiform, about 5.0 times carapace length; scaphocerite extending well beyond antennular peduncle, about 3.5 times longer than central width, anterior margin broad, bluntly angular, extending well beyond stout distolateral tooth on feebly concave lateral margin.

Epistome unarmed. Thoracic sternites narrow, fourth sternite without slender median process.

Mandible (left) fairly slender, without palp; molar process normal with four strong blunt teeth; incisor process slender, with transverse row of four acute teeth distally, two small central teeth, larger acute tooth medially, large broad truncated tooth laterally. Maxillula with feebly bilobed palp, larger lobe with short simple seta; upper lacinia slightly broadened proximally, distoventral margin rounded, with about 8 simple spines; lower lacinia short, tapering, blunt, with numerous distal spiniform setae ventrally. Maxilla with blunt palp, broadened proximally with short plumose setae laterally, basal endite deeply bilobed, lobes subequal, with few simple setae distally; coxal endite obsolete, medial margin broadly convex; scaphognathite normal, about 3.3 times longer than central width, posterior lobe well developed, broad; anterior lobe with medial border emarginate. First maxilliped with slender elongate palp with preterminal setulose seta, basal endite large, broad, rounded, densely setose medially, coxal endite small, convex, sparsely provided with long setae; exopod with

flagellum slender with four long plumose distal setae, caridean lobe, large, broad; epipod large, triangular, feebly bilobed. Second maxilliped with normal endopod, dactylar segment about 3.0 times longer than central width, medial margin feebly concave, densely spinose, with serrated spines, propodal segment densely spinose along distal margin, carpus with small distomedial lobe; exopod with slender flagellum with narrow lateral lobe proximally and four long plumose distal setae, coxa medially convex with simple subrectangular epipod laterally, without podobranch. Third maxilliped with endopod slender, reaching to about proximal end of carpocerite; ischiomerus and basis feebly separated, medial junction indicated by small notch, ischiomerus slender, feebly bowed, uniform, about 6.0 times longer than central width, sparsely setose laterally, numerous slender simple setae medially; penultimate segment about 0.66 of ischiomerus length, tapering slightly distally, about 4.75 times longer than proximal width, sparsely setose laterally, numerous long robust setae medially; terminal segment about 0.6 of penultimate segment length, tapering, with short simple spine distally, about 5.5 times longer than proximal width, with numerous transverse groups of serrulate spines medially, sparsely setose laterally; basis with medial border feebly convex, sparsely setose, lateral margin short, convex, without exopod; coxa with small rounded medial process, lateral plate oval; arthrobranch rudimentary, with feeble indications of lamellae only.

First pereopods slender, extending to slightly exceed distal margin of scaphocerite by fingers of chela. Chela with palm subcylindrical, slightly tapering distally, about 2.8 times longer than proximal width, with 2-3 feeble transverse rows of serrulate setae proximally; fingers simple, slender, tapering distally, small hooked tips, dactylus about 0.75 of palm length, 5.2 times longer than proximal width, with cutting edges entire, lateral; carpus about 1.4 times chela length, slender, tapering proximally, about 8.0 times longer than distal width, with transverse row of serrulate setae distoventrally; merus slender, uniform, about 0.9 of carpus length, 7.5 times longer than central width; ischium about 0.6 of carpus length, 4.2 times longer than distal width; basis about 0.45 of ischial length; coxa with small feebly setose ventromedial process.

Second pereopods markedly unequal. Major

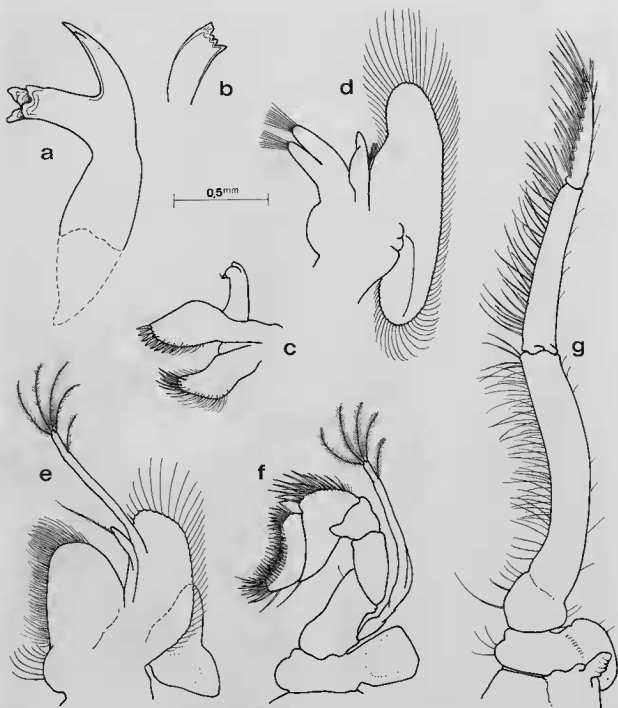


FIG. 36. — *Mesopontonia gracilicarpus* sp. nov., ovigerous female, holotype. a, mandible. b, same, incisor process. c, maxillula. d, maxilla. e, first maxilliped. f, second maxilliped. g, third maxilliped.

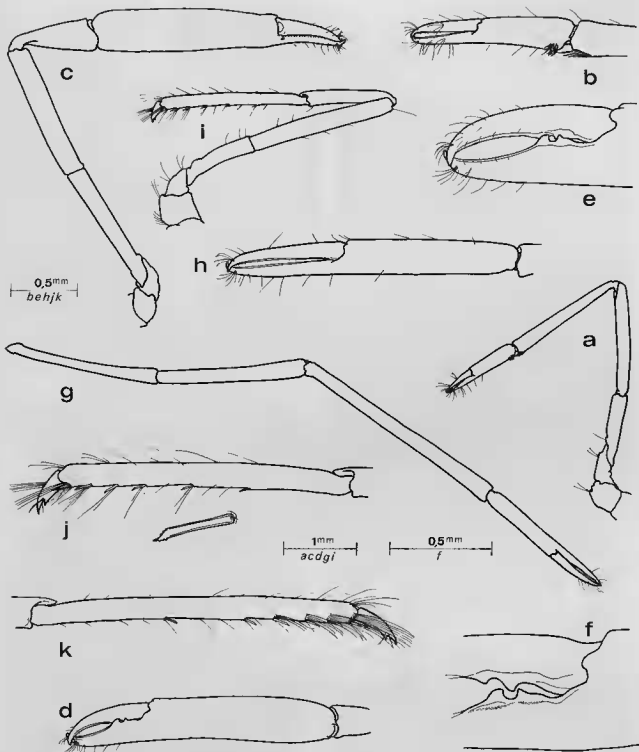


FIG. 37. — *Mesopontonia gracilicarpus* sp. nov., ovigerous female, holotype. a, first pereiopod. b, same, chela. c, major second pereiopod. d, same, chela. e, same, fingers. f, same, proximal region of fingers. g, second pereiopod. h, same, chela. i, third pereiopod. j, same, propod and dactyl, with ventral propodal spine (not to scale). k, fifth pereiopod, propod and dactyl.

pereiopod (right) robust, exceeding carapocerite by carpus and chela; chela subequal to carapace length, with palm subcylindrical, slightly swollen proximally, about 4.0 times longer than proximal depth, smooth, glabrous, fingers equal to about 0.46 of palm length, dactylus slender, tapering, curved, with strongly hooked tip, about 4.6 times longer than proximal depth, cutting edge distally concave, sharp, entire, proximally with small blunt distal and larger more acute, slightly recurved proximal teeth, fixed finger similar, deeper, about 3.8 times longer than central depth, with larger proximal teeth, separated by narrow U-shaped notch, distal tooth larger, blunt, proximal tooth smaller, more acute; carpus short, stout, distally enlarged, about 0.5 of palm length, smooth, distally unarmed; merus about 0.72 of palm length, uniform, about 6.0 times longer than wide, unarmed; ischium about 0.95 of meral length, about 6.2 times longer than distal width, slightly tapered proximally, unarmed; basis and coxa without special features. Minor second pereiopod (left) very slender, exceeding carapocerite by distal fifth of merus; chela about 0.65 of carapace length, 0.65 of major chela length; palm subcylindrical, smooth, about 4.6 times longer than deep, uniform, fingers equal to 0.68 of palm length, slender simple, with acute hooked tips, dactyl about 1.6 times longer than proximal depth, cutting edge straight sharp, entire, without teeth; fixed finger similar; carpus elongate, slender, about 1.5 times chela length, 0.9 of carapace length, about 11.0 times longer than distal width, tapering slightly proximally, unarmed, merus subequal to chela length, about 0.66 of carpus length, about 8.4 times longer than distal width, tapering slightly proximally, unarmed; ischium subequal to meral length, about 9.5 times longer than distal width, tapering proximally, unarmed; basis and coxa without special features.

Ambulatory pereiopods slender. Third pereiopod exceeding lateral tooth of scapocerite by dactyl and about 0.16 of propod length, unguis distinct from corpus, simple, curved, about 0.6 of corpus length, corpus compressed, about 2.0 times longer than proximal depth, with strong acute distoventral tooth, proximal ventral margin feebly concave, sharp, entire; propod about 0.6 carapace length, about 11.3 times longer than deep, uniform, with distoventral and preterminal pairs of spines, four single ventral spines, spines

obliquely truncated distally, dorsal surface of truncation with small acute denticles, opposite ventral surface with minute tubercles, with numerous long simple setae, several transverse rows distally; carpus about 0.6 of propod length, about 5.2 times longer than distal width, slightly tapering proximally, with strong distodorsal lobe, unarmed; merus subequal to propod length, subuniform, about 7.75 times longer than central width, unarmed; ischium about 0.5 of merus length, 7.5 times longer than central width, unarmed; basis and coxa without special features. Fourth and fifth pereiopods similar; fifth propod about 1.1 times fourth propod length, about 14.5 times longer than wide, with well developed transverse rows of setae distolaterally.

Uropods clearly exceeding telson, protopodite with posterolateral angle rounded; exopod narrow, about 3.9 times longer than wide, lateral border straight, with small distolateral tooth, with larger mobile spine medially, diaeresis distinct; endopod slender, about 0.9 of exopod length, about 3.8 times longer than maximal width, at 0.3 of length.

Ova moderately numerous and small.

MEASUREMENTS (mm). — Carapace length, 3.35; carapace and rostrum, 5.8; total body length (approx.), 16.5; chela of major second pereiopod, 3.5; chela of minor second pereiopod, 2.2; length of ovum, 0.6.

SYSTEMATIC POSITION. — Closely related to *Mesopontonia gorgoniophila* Bruce, which it closely resembles in most details of its morphology. *M. gracilicarpus* may be readily distinguished from that species by the strongly marked differences between the second pereiopods. In *M. gorgoniophila*, the second pereiopods are also distinctly unequal, but not nearly to the extent found in *M. gracilicarpus*. The difference lies particularly in the minor second pereiopod. In *M. gorgoniophila*, the carpus is only about 0.75 of the palm length, 0.45 of the chela length, and also much shorter than the merus. In *M. gracilicarpus* it is about 1.5 times the length of the chela and subequal merus. In the major second pereiopod, the dactylus, in *M. gorgoniophila*, bears an oblique distodorsal carina that is not present in *M. gracilicarpus*, and the cutting edge bears only a single large acute tooth proximally, whereas *M. gracilicarpus* has two smaller teeth.

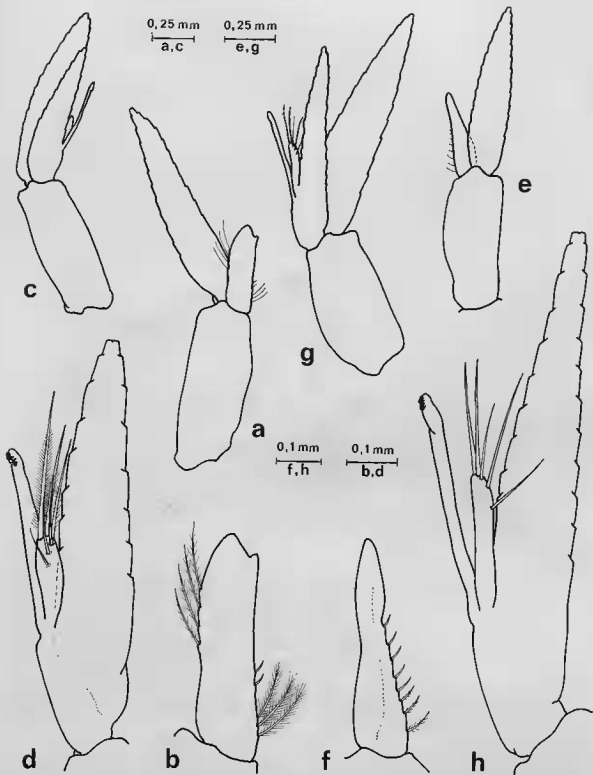


FIG. 38. — *Periclimenes vaubani* sp. nov., male paratype, stn DW 72. a, first pleopod. b, same, endopod. c, second pleopod. d, same, endopod. *Pontonia monnioti* sp. nov., male, holotype, stn CP 275. e, first pleopod. f, same, endopod. g, second pleopod. h, same, endopod.

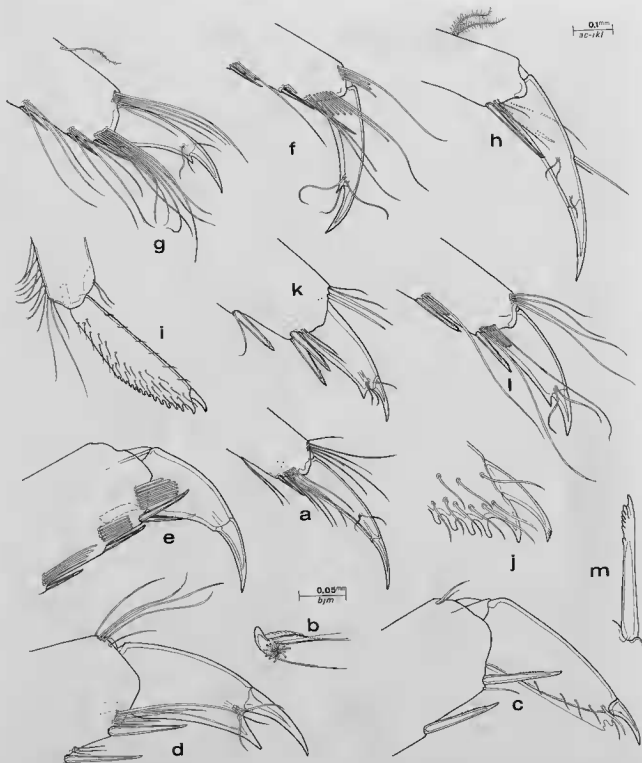


FIG. 39. — Ambulatory pereiopods, third unless otherwise noted. a, *Periclimenes fujinoi* sp. nov., holotype, male. b, same, tip of dactyl of first pereiopod. c, *Periclimenes hertwigi* Balss, stn DW6. d, *Periclimenes parvispinatus* sp. nov., holotype, female. e, *Periclimenes unungulatus* sp. nov., holotype, female. f, *Periclimenes richeri* sp. nov., holotype, female. g, *Periclimenes vaubani* sp. nov., holotype, female. h, *Periclimenes* sp., "grandis group". i, *Pontonia monnotti* sp. nov., holotype, male. j, same, distal dactyl. k, *Altopontonia disparostris* sp. nov., holotype, female. l, *Mesopontonia gracilicarpus* sp. nov., holotype, female. m, same, distoventral spine.

ETYMOLOGY. — *Gracilis*, slender, thin (Latin); *carpus*, latinized form of *karpos*, wrist (Greek); with reference to the morphology of the first pereiopod.

REMARKS. — *Mesopontonia gracilicarpus* is only the second species to be referred to this genus. *M. gorgoniophila* is known to be an associate of gorgonian octocorals including *Melitheia* and *Acabaria* spp. and it is probable that *M. gracilicarpus* will prove to have similar associations. *M. gorgoniophila* has been reported only from the northern South China Sea (BRUCE, 1967), the Philippines (BRUCE, 1985) and eastern Australia (BRUCE, 1983), from depths to 270 m. The present record of 400 m is therefore at considerably greater depth.

ANCHISTIOIDIDAE

ANCHISTIOIDES Paulson, 1875

Anchistioides willeyi (Borradaile, 1899)

RESTRICTED SYNONYMY

Palaemonopsis willeyi Borradaile, 1899 : 410, pls 36, 37 fig. 7.

Anchistioides willeyi - GORDON, 1935 : 345, figs 23 a, 24 a. — HOLTHUIS, 1952 : 214, figs 106, 107. — BRUCE, 1978 : 286, fig. 44.

MATERIAL EXAMINED. — New Caledonia. Lagoon survey : stn 370, 22°37.8' S, 167°05.7' E, 127 m, 30 October 1984 : 1 ovig. ♀ (MNHN-NA 111671).

REMARKS. — The single example was collected from the Grand Récif Sud and has a carapace length of 19.3 mm, with a rostral dentition of 8/3. The chelae of the second pereiopods have the fingers equal to about half the length of the whole chela, or subequal to the palm length, and therefore correspond to the short rostrum-robust chela form noted from Madagascar (BRUCE, 1978).

This species has not been previously recorded from depths of over 100 m. Generally common in depths of 30 m or less, the greatest depth at which this species has been previously recorded is 73-84 m in the South China Sea (BRUCE, 1979). The species has also not been previously recorded from New Caledonia.

DISTRIBUTION. — Type locality : Ralun, New Britain. Also known from Zanzibar, Tanganyika, Kenya, Madagascar, Maldivé Islands, Singapore, Indonesia, Philippines, South China Sea, and Australia.

DISCUSSION

About 90 genera of shrimps are now represented in the superfamily Palaemonoidea, of which the overwhelming majority occur in shallow tropical waters, with their greatest diversity occurring in the coral reef habitat, but with many species also occurring in estuarine and fresh waters. Comparatively few have, so far, been found to occur in deeper marine waters, although this paucity may be partly due to the practical difficulties of adequately sampling these generally small animals.

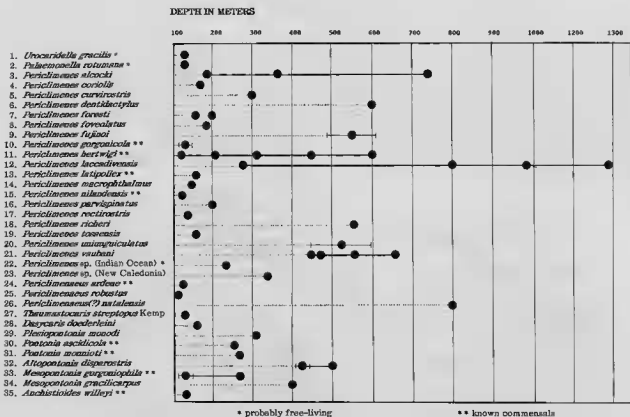
In the Indo-West Pacific region, data are now available on eleven genera, represented by 33 identified species, found in depths in excess of 100 m. Of these, only six species also occur in lesser depths. The greatest depth record for a palaemonoid shrimp is established by *Pericli-*

menes laccadivensis (Alcock & Anderson, 1894) from 1285 m, the only species so far known to occur at more than 1 000 m. As specimens of this species have also been reported from about 275 m, (BRUCE, 1979) this species has a bathymetric range of some 1 000 m, a very considerable range for benthic species. Nine species only have been recorded from depths of over 500 m.

It is difficult to obtain data to establish whether the deep-water palaemonoid shrimps are free-living or commensally associated with other marine vertebrates. In most cases, commensalism is a generic phenomenon, and where the associations of shallow-water species are known, it is most probable that the deep-water species are involved with similar associations. Thus, the shallow-water species of *Dasycaris* are now

TABLE I

BATHYMETRIC DISTRIBUTIONS OF INDO-WEST PACIFIC DEEP-SEA PALAEMONID SHRIMPS.



known to be associated with coelenterates, such as pennatulaceans, so that it is likely that *Dasycais doederleini* Balss will have similar associations. Species of *Periclimenaeus* are generally found only in sponges, although some may occur in colonial tunicate colonies. Indo-West Pacific species of *Pontonia* have so far been found in ascidians and *Mesopontonia gorgoniophila* Bruce with gorgonaceans. *Thaumastocaris streptopus* and *Anchistioides* species are also sponge associates. The shallow-water species of *Periclimenes* are associated with a wide variety of host phyla and assessing the trophic status of the deep-water species is presently rather conjectural. Most species of the *P. grandis* group are free-living micropredators or scavengers and have relatively long simple dactyls on the ambulatory pereopods. The other species of the genus,

predominantly commensals, have dactyls on the ambulatory pereopods that are relatively short and are usually at least provided with an accessory tooth but may often be highly ornate. However, the accessory tooth may be lost in some species, so that the dactyl becomes simple, as may occur in the cases of *P. tosaensis* Kubo and *P. unguiculatus*. Of the deep-water species, *P. nilandensis* Borradaile is a known associate of hydroids, antipatharians and gorgonians. *P. gorgonicola* Bruce and *P. latipollex* Kemp are also associated with gorgonians. *P. hertwigi* is known to associate with echinoid hosts, and it seems probable that *P. rectirostris* and other species (*P. curvirostris* Kubo, *P. parvispinatus*) may have similar habits. The occurrence of *P. parvispinatus* in a deep water trap is of particular interest as, from its morphology, it would appear

to be a commensal species, but its occurrence in a baited trap suggest that it may be a free-living micropredator or scavenger or, at least, one that is able to leave its host to forage independently.

As in shallow water, the genus *Periclimenes* is the most strongly represented taxon in depths in excess of 100 m. At present this genus contains about 121 species in the Indo-West Pacific

region, of which only 19 species (15.7%)¹ have been found in 100 m or greater depths. A key to some of these species was provided by BRUCE (1985) which unfortunately included an error and an omission. To rectify these defects and to include the new species described in this report, a new key is now provided.

Deep Water Indo-West Pacific *Periclimenes*¹

- | | |
|---|---|
| 1. Antennal spine present | 2 |
| — Antennal spine absent; R. 10/4 | <i>P. gorgonicola</i> Bruce, 1969 |
| 2. Dactyls of ambulatory pereopods simple | 3 |
| — Dactyls of ambulatory pereopods not simple | 10 |
| 3. Fourth thoracic sternite with slender median process | 4 |
| — Fourth thoracic sternite without slender median process | 5 |
| 4. Supraorbital spines present; R. 8-10/3-5 ... | <i>P. nilandensis</i> Borradaile, 1915 |
| — Supraorbital spines absent; R. ? | <i>Periclimenes</i> sp. (<i>grandis</i> group) |
| 5. Rostrum elongate, straight, subequal to postorbital carapace length;
R. 11-12/4-5 | <i>P. rectirostris</i> Bruce, 1981 |
| — Rostrum shorter, distinctly less than postorbital carapace length ... | 6 |
| 6. Rostral lamina shallow | 7 |
| — Rostral lamina deep | 9 |
| 7. Rostrum arched; third abdominal segment with posteromedian dorsal carina; R. 1 + 6-7/1-2 | <i>P. tosaensis</i> Kuho, 1951 |
| — Rostrum not arched, straight; third abdominal segment without dorsal carina: | 8 |
| 8. Ambulatory propods strongly spinose distally, fifth with three pairs of spines, eyestalk strongly tapered distally; R. 1 + 8/1 | <i>P. macrophthalmus</i> Fujino, 1970 |
| — Ambulatory propods feebly spinose distally, third with single distoventral spine only; eyestalk not strongly tapered distally; R. ? | <i>P. fujinoi</i> sp. nov. |
| 9. Eye markedly reduced; epigastric tubercle blunt; rostral lamina moderately deep; R. 8/1 | <i>P. foresti</i> Bruce, 1981 |
| — Eye well developed; epigastric tooth acute; rostral lamina distinctly slender; R. 7/2 | <i>P. uniunguiculatus</i> sp. nov. |
| 10. Dactyl of ambulatory pereopods with distoventral angle of corpus with carinate lamella | 11 |
| — Dactyl of ambulatory pereopods with distoventral angle of corpus bearing simple accessory tooth only | 12 |
| 11. Palm of second pereopod chela slender, tuberculate, four times longer than deep; R. 7/3 | <i>P. dentidactylus</i> Bruce, 1985 |

1. See Addendum, p. 215.

- Palm of second pereiopod chela robust, smooth, about three times longer than deep; R. 4-6/1-2..... *P. hertwigi* Balss, 1913
12. Telson with two pairs of dorsal spines only 13
- Telson with four pairs of dorsal spines; R 1 + 8/3... *P. alcocki* Kemp, 1922
13. Rostrum very slender, with three postorbital teeth situated on carapace... 14
- Rostrum not particularly slender; with fewer than three postorbital teeth... 15
14. Hepatic and antennal spines on same horizontal level; dactyl of major second pereiopod with distinct lateral flange; R. 8/3 *P. latipollex* Kemp, 1922
- Hepatic spine situated at distinctly lower level than antennal spine; dactyl of major second pereiopod without lateral flange; R. 10/3. *P. laccadivensis* (Alcock & Anderson, 1894)
15. Ambulatory dactyls short and stout, strongly curved, propods with dense tufts of long setae; R. 8/2..... *P. curvirostris* Kubo, 1940
- Ambulatory dactyls and propods not as above 16
16. Rostrum with well developed dorsal and ventral carinae, midribs particularly stout, antennal and hepatic spines slender and small; R. 8/1..... *P. parvispinatus* sp. nov.
- Rostral midribs, antennal and hepatic spines normally developed.... 17
17. Branchiostegite and pleura foveolate; dorsal telson spines minute; R. 8-10/ 3-6..... *P. foveolatus* Bruce, 1981
- Branchiostegite and pleura non-foveolate; dorsal telson spines normal.. 18
18. Second to fifth pereiopods generally setose, with short erect setae; R. 8/2 *P. coriolis* Bruce, 1985
- Pereiopods not markedly setose 19
19. Rostrum acutely tapered, proximal dorsal carina elevated; second pereiopod with carpus less than 0.5 of palm length; lamella of scaphocerite feebly exceeding tip of lateral tooth; R. 1. + 7-8/2... .. *P. vaubani* sp. nov.
- Posterior dorsal carina not distinctly elevated; carpus of second pereiopod nearly equal to palm length; lamella of scaphocerite far exceeding lateral tooth; R. 9/1 *P. richeri* sp. nov.
- (?, rostral dentition unknown)

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ADDENDUM

Periclimenes granuloides Hayashi, from Tosa Bay, Japan, is also known from 130 m. *P. granuloides* is very closely related to *P. foresti*, but may be distinguished from that species by the absence of spinules from the ventral border of the ambulatory pereopods. The hepatic spine also appears much larger and more robust, and the rostral dentition is 2 + 7/2. For *P. foresti*,

the ventral margin of the ambulatory propod has a small distoventral spine and three small ventral spines. The inclusion of *P. granuloides* increases the number of deep-water *Periclimenes* species to 20. (HAYASHI, K.-I. 1986. In: Decapod Crustaceans from Continental shelf and Slope around Japan. J.F.R.C.A., Tokyo : 1-336, pls 1-76).

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